

# Appendix J

Fauna Assessment (Harewood 2018)

# Fauna Assessment



## Maddington Kenwick Strategic Employment Area

### Precinct 2 & 3B

### City of Gosnells

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Version 2

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**Acronyms/Abbreviations:**

**ALA:** Atlas of Living Australia [www.ala.org.au](http://www.ala.org.au)

**BA:** Birdlife Australia (Formerly RAOU, Birds Australia).

**BC Bill:** *Biodiversity Conservation Bill (2015)*. WA Government.

**°C:** Degrees Celsius.

**CALM:** Department of Conservation and Land Management (now DBCA), WA Government.

**CAMBA:** China Australia Migratory Bird Agreement 1998.

**CBD:** Central Business District.

**DBCA:** Department of Biodiversity, Conservation and Attractions (formerly DPaW, DEC, CALM, DoE), WA Government

**DBH:** Diametre at Breast Height – tree measurement.

**DEC:** Department of Environment and Conservation (now DBCA), WA Government.

**DEH:** Department of Environment and Heritage (now DotEE), Australian Government.

**DEP:** Department of Environment Protection (now DER), WA Government.

**DER:** Department of Environment Regulation (now DWER), WA Government.

**DEWHA:** Department of the Environment, Water, Heritage and the Arts (now DotEE), Australian Government

**DMP:** Department of Mines and Petroleum (formerly DoIR), WA Government.

**DoE:** Department of Environment (now DER/DBCA), WA Government.

**DoP:** Department of Planning, WA Government.

**DotE:** Department of the Environment (now DotEE), Australian Government.

**DotEE:** Department of the Environment and Energy (formerly SEWPaC, DWEHA, DEH & DotE), Australian Government.

**DoIR:** Department of Industry and Resources (now DMP), WA Government.

**DoW:** Department of Water (now DWER), WA Government.

**DPaW:** Department of Parks and Wildlife (now DBCA), WA Government.

**DWER:** Department of Water and Environmental Regulation (formed by the amalgamation of OEPA, DoW and DER), WA Government.

**EP Act:** *Environmental Protection Act 1986*, WA Government.

**EPA:** Environmental Protection Authority, WA Government.

**EPBC Act:** *Environment Protection and Biodiversity Conservation Act 1999*, Australian Government.

**ha:** Hectare (10,000 square metres).

**IBRA:** Interim Biogeographic Regionalisation for Australia.

**IUCN:** International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union.

**JAMBA:** Japan Australia Migratory Bird Agreement 1981.

**km:** Kilometre.

**m:** Metre.

**MKSEA:** Maddington Kenwick Strategic Employment Area.

**mm:** Millimetre.

**P:** Priority - DBCA fauna conservation ranking.

**POS:** Public Open Space.

**ROKAMBA:** Republic of Korea-Australia Migratory Bird Agreement 2007.

**S:** Schedule - Western Australian *Wildlife Conservation Act (1950)* Threatened Fauna Category.

**SEWPaC:** Department of Sustainability, Environment, Water, Population and Communities (now DotEE), Australian Government.

**SRE:** Short Range Endemic.

**SSC:** Species Survival Commission, International.

**WA:** Western Australia.

**WAM:** Western Australian Museum, WA Government.

**WAPC:** Western Australian Planning Commission, WA Government.

**WC Act:** *Wildlife Conservation Act 1950*, WA Government.

## SUMMARY

This report details the results of a fauna assessment of various freehold allotments within Precinct 2 and 3B of the Maddington Kenwick Strategic Employment Area (MKSEA) located in the City of Gosnells (subject site). The subject site covers approximately 253 ha (Precinct 2 = ~189 ha, Precinct 3B = ~64 ha) most of which is cleared or parkland cleared though some areas of remnant native vegetation remain (total area about 35 ha) (Figures 1 & 2).

It is understood that outline development plans are being prepared to support future development across the subject site. A range of investigations, including this fauna survey, have been undertaken in order to fully understand the suite of environmental values across the area.

The scope of works was to conduct a level 1 fauna survey as defined by the Environmental Protection Authority (EPA 2016). Because black cockatoos are known to frequent the area a targeted assessment of these sites significance to these species has also been carried out. The assessment has therefore included a literature review (“desktop study”) and several daytime reconnaissance surveys.

Remnant native vegetation within the subject site is now represented mainly by generally small groves of woodland/forest groves comprise of tree species in various densities and combinations including marri, *banksia*, flooded gum and paperbark over native understorey, introduced weeds or grasslands (~4.22% of the subject site). Riparian vegetation is mainly represented by a paperbark and flooded gum woodland over non-native groundcover bordering much of Yule brook in the northern section of the subject site (~5.2 % of the subject site). The wetland vegetation present includes seasonally inundated shrublands with a low to medium shrub layer (2.97% of the subject site).

The balance of the subject site (~86.29% of the subject site) is either totally cleared or parkland cleared with scattered trees, mostly planted non-endemic eucalyptus species, with a small number of endemics (e.g. marri, jarrah and flooded gum).

Overall fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of remnant patches. Most areas lack any natural attributes and are now only utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats. As a consequence, the fauna diversity of the subject site is well below levels present prior to historical disturbances having occurred.

The individual remnant native trees and groves of trees, while limited in extent support the primary fauna habitat value although these areas vary in quality, with most areas being totally degraded and lacking significant native groundcover/shrubs and microhabitats such as hollow logs.



Yule Brook is also highly degraded but has some value as an ecological linkage which provides a corridor for wildlife movement (albeit tenuous at some points) across the subject site.

The black cockatoo habitat tree assessment identified a total of 84 trees with a DBH of  $\geq 50$ cms within the subject site. Eighty two of the trees (82, ~97.6%) were not observed to contain hollows of any size. Two (2, ~38.7%) trees contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

No trees were identified as potentially containing hollows suitable for black cockatoos to use for nesting purposes. Additional details on each habitat tree observed can be found in Appendix D.

Foraging debris (all in the form of chewed marri fruits) left by black cockatoos was observed at several locations with the subject site during the survey period. This foraging activity was attributed to all three species based on the nature of chew marks on the marri fruits. Evidenced left by the forest red-tailed cockatoo was most prevalent.

It is difficult to calculate the actual extent of quality natural foraging habitat within the subject site given it is largely comprised of patchy, fragmented vegetation, but it is unlikely to total more than about 6.19 ha (i.e. areas mapped as containing marri and banksia– see Figure 5).

Roosting activity by the forest red-tailed black cockatoo has been recorded within the subject site in the past (360 Environmental 2012) and the recent Great Cocky Count (GCC) coordinated by Birdlife Australia in April 2018 confirmed his same area was still in use as a roosting site. The locations of the observed roosting activity and another site nearby are shown in Figure 5. No other roosting activity within the subject site was noted during the most recent survey.

Based on available vegetation mapping it is estimated that there is approximately 15,755 ha of native vegetation within 12 km the subject site (~29% of total area) much of which is likely to represent black cockatoo habitat of some type. There are also extensive areas (>50,000 ha in total) of potential black cockatoo habitat in various national/regional parks and state forest areas in the wider area (360 Environmental 2012).

Opportunistic fauna observations are listed in Appendix B. Including those species recorded on camera traps and during the bat call survey, a total of 51 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within the subject site during the survey period. Eight introduced species (red fox, rabbit, house mouse, cat, spotted turtle dove, laughing turtle dove, rainbow lorikeet and laughing kookaburra) were also recorded.

Most of the fauna species recorded were common, widespread bird species.

Besides those species already mentioned as having been recorded (i.e. the three black cockatoo species and quenda) no other fauna species of conservation significance were recorded during the survey period.

With respect to native vertebrate fauna, 10 mammals (includes eight bat species), 102 bird, 25 reptile, eight frog and two fish species have previously been recorded in the general area, some of which have the potential to occur in or utilise sections of the subject site at times, a conclusion largely based on the presence of apparently suitable habitat.

Of the 147 native animals that are listed as potentially occurring in the area, four are considered to be endangered/vulnerable or in need of special protection under State and/or Commonwealth legislation, these being the three species of black cockatoo and the peregrine falcon. In addition, the Priority 4 quenda also occurs, though habitat for this species appears largely marginal in quality.

With respect to vertebrate fauna in general, no significant impacts are anticipated as a consequence of development at the site taking place. In cases where some impact is anticipated, the degree of the impact is only expected to be low and relates to the loss of small areas of habitat. As most species are common and widespread no overall change in their conservation status is anticipated, despite a possible localised reduction in habitat extent.

Based on available information it is considered, at this stage, very unlikely that impacts on black cockatoos (or any other *EPBC Act* listed threatened or migratory species) which may occur as a result of development at any scale within the subject site will result in a “significant impact” as defined by the Commonwealth DotEE (DotE 2013). The presence of a known roost site within one lot will however need to be taken into consideration, though it is unclear if its removal would constitute “significant impact” as defined by the DotEE. The conclusions drawn should be reviewed once development plans are finalised.

Subject to the proposal being it is recommended that a fauna management plan be prepared for implementation during initial site works with the aim of minimising impacts on fauna and fauna habitat as much as reasonable and practicable.

## 1. INTRODUCTION

This report details the results of a fauna assessment of various freehold allotments within Precinct 2 and 3B of the Maddington Kenwick Strategic Employment Area (MKSEA) located in the City of Gosnells (subject site). The subject site is situated about 10 kilometres south east of the Perth central business district in south west Western Australia and is centred at approximately 32.018364°S and 115.984582°E (Figure 1).

The subject site covers approximately 253 ha (Precinct 2 = ~189 ha, Precinct 3B = ~64 ha) most of which is cleared or parkland cleared though some areas of remnant native vegetation remain (total area about 35 ha) (Figure 2).

## 2. DEVELOPMENT PROPOSAL

It is understood that outline development plans are being prepared to support future development across Precinct 2 and Precinct 3B. A range of investigations, including this fauna survey, have been undertaken in order to fully understand the suite of environmental values across the area. The findings of this fauna survey and other investigations will be used to inform and support the development, with the primary aim of minimising potential environmental impacts as much as reasonable and practicable.

It is also anticipated that the information presented will be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats as part of finalising the outline development plan and for future subdivision development approval processes.

## 3. SCOPE OF WORKS

The scope of works is to conduct a level 1 fauna survey as defined by the EPA (EPA 2016). Because the general area is known to be utilised by black cockatoos the scope of the survey work has been expanded to include a Level 2 (EPA 2016) assessment of the sites significance to these species as well. The fauna assessment has therefore included:

1. Level 1 fauna assessment (in accordance with EPA (2016) guidelines);
2. Targeted searches for black cockatoo habitat/site use (habitat trees, existing and potential nest hollows, foraging and roosting habitat);
3. Identification of any other potentially occurring significant fauna species and their habitat; and
4. Report summarising methods, results and discussion on likely constraints on development within the subject site.

This survey report has been prepared for use in the EPA's EIA process (if required) and is considered suitable for this purpose.

Note: For the purposes of this proposal the term Black Cockatoo is in reference to Baudin's Black Cockatoo *Calyptorhynchus baudinii*, Carnaby's Black Cockatoo *Calyptorhynchus latirostris* and the Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*.

## **4. METHODS**

### **4.1 POTENTIAL FAUNA INVENTORY - LITERATURE REVIEW**

#### **4.1.1 Database Searches**

Searches of the following databases were undertaken to aid in the compilation of a list of conservation significant fauna potentially occurring within the subject site:

- DBCA's NatureMap Database Search (combined data from DBCA, ALA, WAM, BA and consultant's reports) (DBCA 2018b); and
- Protected Matters Search Tool (DotEE 2018).

It should be noted that lists produced during the abovementioned database searches contain observations/inferred distributions from a broader area than the subject site and therefore may include species that would only ever occur as vagrants due to a lack of suitable habitat or the presence of only marginal habitat within the subject site itself. The databases also often included or are based on very old records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information also needs to be taken into consideration when determining what actual species may be present within the specific area being investigated.

#### **4.1.2 Previous Fauna Surveys in the Area**

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publicly available and could not be referenced. The most significant of those available have been used as the primary reference material for compiling a list of fauna species of conservation significance most likely to occur in the general area.

Those reports referred to included, but were not limited to:

- 360 Environmental (2012). Black Cockatoo Survey – Maddington Kenwick Strategic Employment Area. Unpublished report for the City of Gosnells.

- ATA (1994). A Report of a Fauna Survey of Perth Airport. Report 93/78. Unpublished report for the Federal Airports Corporation.
- ATA Environmental (2006). Vertebrate Fauna Assessment Brookdale Redevelopment Area. Unpublished report for the Armadale Redevelopment Authority.
- Bancroft, W., Moore, A., & Bamford, M. (2017). Black-cockatoo values of the Maddington Kenwick Strategic Employment Area (MKSEA) Precinct 3A (Kenwick/Wattle Grove). Unpublished report for Emerge Associates.
- Dell, J. (pers.comm) (1994). Results of Western Australia Museum Surveys, December 1986 to April 1990.
- ENV Australia (2005). Southern River Precinct 3 - Environmental Review. Unpublished report for the City of Gosnells.
- Harewood, G. (2009). Fauna Assessment (Level 1) – Mills Park - Beckenham. Unpublished report for Cardno (WA) Pty Ltd.
- Harewood, G. (2014). Fauna Assessment - Hazelmere Precinct 9A. Unpublished report for Emerge Associates.
- Harewood, G. (2016). Fauna Assessment - Maddington Kenwick Strategic Employment Area – Precinct 3 - City of Gosnells. Unpublished report for Emerge Associates.
- Harvey, M. S., Dell, J. How, R. A., & Waldock, J. M. (1987). Ground Fauna of Bushland Remnants on the Ridge Hill Shelf and Pinjarra Plain Landforms, Perth. Report to the Australian Heritage Commission. NEP Grant N95/49. 56 pp.
- How, R.A (1995). Objection Assessment of Fauna Values for Perth Airport. Unpublished report for the Australian Heritage Commission.
- How, R.A, Harvey, M.S., Dell J., & Waldock, J.M. (1996). Ground Fauna of Urban Bushland Remnants in Perth. Report to the Australian Heritage Commission. NEP Grant N93/04. 103 pp.
- Turpin, J. and Bamford, M. (2009). Keane Road Strategic Link Armadale, Fauna Assessment. Unpublished report for EnviroWorks Consulting.

As with the databases searches some reports refer to species that would not occur in the subject site due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

### 4.1.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the subject site:

- Anstis, M. (2013). Tadpoles and Frogs of Australia. New Holland Publishers, Sydney.
- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.
- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.
- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2010). Field Guide to Reptiles and Frogs of the Perth Region. UWA Press, Nedlands.
- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.
- Cogger, H.G. (2014). Reptiles and Amphibians of Australia. 7th Edition. CSIRO Publishing.
- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.
- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.
- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne.
- Morgan, D.L., Beatty, S.J., Klunzinger, M.W, Allen, M.G. and Burnham, Q.E (2011). Field Guide to the Freshwater Fishes, Crayfishes and Mussels of South Western Australia. Published by SERCUL.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.
- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.

- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.
- Van Dyck, S., Gynther, I. & Baker, A. Eds (2013). Field Companion to The Mammals of Australia. Queensland Museum.
- Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Reed, New Holland, Sydney.
- Woinarski, J., Burbidge, A. & Harrison, P. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing.

#### 4.1.4 Fauna of Conservation Significance

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Administered by the Australian Government DoEE;
- *Wildlife Conservation Act 1950 (WC Act)*. Administered by the Western Australian DBCA (Govt. of WA 2018);
- Red List produced by the SSC of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and
- DBCA Priority Fauna list. A non-statutory list maintained by the DBCA for management purposes (DBCA 2018a).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);
- China Australia Migratory Bird Agreement 1998 (CAMBA);
- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and
- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note – Some species listed under JAMBA are also protected under Schedule 5 of the *WC Act*.)

Most but not all migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (MNES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the subject site has been assessed using the most recent lists published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes is provided in Appendix A.

A number of other species not listed in official lists can also be considered of local or regional conservation significance. These include species that have a restricted range, those that occur in breeding colonies and those at the limit of their range.

While not classified as rare, threatened or vulnerable under any State or Commonwealth legislation, a number of birds have been listed as species of significance on the Swan Coastal portion of the Perth Metropolitan Region (Bush Forever - Government of Western Australia 1998 and 2000). The bird species are often referred to as “Bush Forever Decreaser Species”.

The three categories used for birds within the Bush Forever documents are:

- Habitat specialists with reduced distribution on the Swan Coastal Plain (code Bh)
- Wide ranging Species with reduced populations on the Swan Coastal Plain. (code Bp)
- Extinct in the Perth region (code Be)

The presence of Bush Forever species should be taken into some consideration when determining the fauna values of an area. Bush Forever decreaser species are indicated as such within the species list held in Appendix B.

#### **4.1.5 Invertebrate Fauna of Conservation Significance**

It can be difficult to identify significant invertebrate species (e.g. short range endemics (SREs) as there are uncertainties in determining the range-restrictions of many species due to lack of surveys, lack of taxonomic resolutions within target taxa and problems in identifying certain life stages. Where invertebrates are collected during surveys, a high percentage are likely to be unknown, or for known species there can be limited knowledge or information on their distribution (Harvey 2002).

For this project, the assessment for conservation significant invertebrates has been limited to those listed by the DBCA and *EPBC Act* database searches (which rely on distribution records and known habitat preferences). No assessment of the potential for SREs to be present has been made.



#### 4.1.6 Likelihood of Occurrence – Fauna of Conservation Significance

Fauna of conservation significance identified during the literature review as previously being recorded in the general area were assessed and ranked for their likelihood of occurrence within the subject site itself. The rankings and criteria used were:

- Would Not Occur: There is no suitable habitat for the species in the subject site and/or there is no documented record of the species in the general area since records have been kept and/or the species is generally accepted as being locally/regionally extinct (supported by a lack of recent records).
  - Locally Extinct: Populations no longer occur within a small part of the species natural range, in this case within 10 or 20 km of the subject site. Populations do however persist outside of this area.
  - Regionally Extinct: Populations no longer occur in a large part of the species natural range, in this case within the Perth section of the Swan Coastal Plain and nearby Darling Range. Populations do however persist outside of this area.
- Unlikely to Occur: The subject site is outside of the currently documented distribution for the species in question, or no suitable habitat (type, quality and extent) was identified as being present during the field assessment. Individuals of some species may occur occasionally as vagrants/transients especially if suitable habitat is located nearby but the subject site itself would not support individuals or a population the species.
- Possibly Occurs: The subject site is within the known distribution of the species in question and habitat of at least marginal quality was identified as being present during the field assessment, supported in some cases by recent records being documented in literature from within or near the subject site. In some cases, while a species may be classified as possibly being present at times, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.
- Known to Occur: The species in question was positively identified as being present (for sedentary species) or as using the subject site as habitat for some other purpose (for non-sedentary/mobile species) during the field survey. This information may have been obtained by direct observation of individuals or by way of secondary evidence (e.g. foraging debris, tracks and scats). In some cases, while a species may be classified as known to occur, habitat may be marginal (e.g. poor quality, fragmented, limited in extent) and therefore the frequency of occurrence and/or population levels may be low.

#### **4.1.7 Taxonomy and Nomenclature**

Taxonomy and nomenclature for vertebrate fauna species used in this report is generally taken from the DBCA's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles and Johnstone (2001) for birds. Jackson and Groves (2015) has been used for mammals.

Common names are taken from the Western Australia Museum (WAM) recognised primary common name listings when specified, though where common names are not provided they have been acquired from other publications. Sources include Cogger (2014), Wilson and Swan (2017), Van Dyck & Strahan (2013), Christidis and Boles (2008), Bush *et al.* (2010), Bush *et al.* (2007), Tyler & Doughty (2009), and Glauret (1961). Not all common names are generally accepted.

### **4.2 SITE SURVEYS**

Daytime reconnaissance surveys of the subject site were carried out by Greg Harewood (Zoologist) on the 23, 24, 25, and 26 October 2017, 14 November 2017 and the 19 February 2018. It should be noted that access to many lots was restricted and therefore direct observations were limited in these areas. Bat surveys call recordings were undertaken on the 23, 24, 25, 26 October 2017. Camera traps were deployed on the 23 October 2017 and retrieved on the 14 November 2017.

#### **4.2.1 Fauna Habitat Assessment**

The vegetation communities identified during the botanical survey of the site carried out by Emerge Associates (Emerge Associates 2018) have been used as the basis for a classification of areas into broad fauna habitat types. This information has been supplemented with observations made during the fauna assessment.

The main aim of the habitat assessment was to determine if it was likely that any species of conservation significance would be utilising the areas that may be impacted on as a consequence of development at the subject site. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

As part of the literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the field survey the habitats within the subject site were assessed and specific elements identified, if present, to determine the likelihood of listed threatened species utilising the area and its significance to them.

#### **4.2.2 Black Cockatoo Habitat Assessment**

A black cockatoo habitat assessment has previously been undertaken over the subject site (and some additional areas) in 2012 by 360 Environmental (360 Environmental 2012). A section of the subject site was also assessed by Harewood in 2015 (Harewood 2016). The primary aim of the 2017/2018 assessment was therefore to survey lots that

were previously inaccessible (if any) and to field check some of the previous results (e.g. potential nest hollows and foraging habitat) to determine their current status. The results of this most recent assessment and the previous results have then been combined into a single dataset.

The following methods were employed during the black cockatoo habitat assessment to comply with the defined scope of works and are based on guidelines published by the DotEE (Commonwealth of Australia 2012) which states that surveys for Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);
- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotEE (Commonwealth of Australia 2012) these being:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

So as to comply with the requested scope of works and in line with the published guidelines the following was carried out.

#### **4.2.2.1 Black Cockatoo Breeding Habitat**

The black cockatoo breeding habitat assessment involved the identification of all suitable breeding trees species (native, endemic species only) within the subject site that had a DBH of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm "caliper".

Target tree species included marri and jarrah or any other *Corymbia/Eucalyptus* species of a suitable size that may have been present. Peppermints, *banksia*, sheoak and *melaleuca* tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with “H” using spray paint for easy future reference.

For the purposes of this assessment a tree containing a potential cockatoo nest hollow was defined as:

*Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by a black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 10cm in diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk were recorded as a “potential black cockatoo nest hollow”.*

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Trees with possible nest hollows were also scratched and raked with a large stick/pole in attempt to flush any sitting birds from hollows and calls of chicks were also listened for. It should be noted that the survey may have been conducted outside of the main breeding season of one or more of the three species of black cockatoo.

#### **4.2.2.2 Black Cockatoo Foraging Habitat**

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the reconnaissance survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

#### **4.2.2.3 Black Cockatoo Roosting Habitat**

Direct and indirect evidence of black cockatoos roosting in trees was within the subject site was noted if observed (e.g. branch clippings, droppings or moulted feathers). Data from the great cocky count (2018) coordinated by Birdlife Australia has also been reviewed.

#### **4.2.3 Camera Traps**

Ten motion sensing, infrared “camera traps” (Acorn model LTI 5210A) were placed within Bush Forever Site 387 which is located between the two precinct areas on the 23 October 2017. These were retrieved in 14 November 2017 (22 days of deployment). The camera traps were set to take three consecutive pictures when triggered, with a 10 second time lapse before any subsequent trigger event. The location of each camera trap is shown in Figure 3.

A total of 220 “camera trap days” were achieved and 9,541 pictures taken, though it should be noted that on some cameras a high percentage of photos taken were caused by moving vegetation. All pictures were examined and fauna species, where possible,

identified. Only one image of each species taken on any one day was documented as a record.

#### **4.2.4 Acoustic Bat Recordings**

Four nights (23, 24, 25, 26 October 2017) of acoustic bat call recordings were undertaken at two sites (two nights at each) within Bush Forever Site 387 using a Wildlife Acoustics SM2+ Bat Detector. The recordings were commenced at sunset each day and continued until sunrise the following day. The recording locations are shown in Figure 3.

The detector converts ultrasonic echolocation signals produced by bats into audible electronic signals that are then recorded. The recordings were later processed by Bob Bullen (Bat Call WA Pty Ltd) to determine the presence of species specific calls.

#### **4.2.5 Opportunistic Fauna Observations**

Opportunistic observations of fauna species were made during the field survey. Methods involved traversing a series of transects across the subject site during the day while searching microhabitats such as logs, rocks, leaf litter and observations of bird species with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

## **5. SURVEY CONSTRAINTS**

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should also be recognised that site conditions can change with time.

Some fauna species are reported as potentially occurring based on there being suitable habitat (quality and extent) within the subject site or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during the field survey;
- species present within micro habitats not surveyed;
- cryptic species able to avoid detection; and
- transient wide-ranging species not present during the survey period.

Lack of observational data on some species should therefore not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

The habitat requirements and ecology of many of the species known to occur in the wider area are often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on an apparent lack of a specific habitat or microhabitat within the subject site. As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the subject site for some purpose. Some species may be present in the general area but may only use the subject site itself on rare occasions or as vagrants/transients.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the subject site (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been assumed to potentially occur in the subject site.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

As previously indicated access to many lots was restricted and therefore direct observations were limited in these areas.

## **6. RESULTS**

### **6.1 POTENTIAL FAUNA INVENTORY – LITERATURE REVIEW**

A list of vertebrate fauna species considered most likely to occur in the subject site has been compiled from information obtained during the literature review and is presented in Appendix B. This listing was refined after information gathered during the site reconnaissance survey was assessed. The results of some previous fauna surveys carried out in the general area are summarised in this listing as are the DBCA NatureMap database search results (with species considered unlikely to occur being omitted). The raw database search results from NatureMap (DBCA 2018b) and the Protected Matters Search Tool (DotEE 2018) are contained within Appendix C.

The list of potential fauna takes into consideration that firstly, the species in question is not known to be locally extinct and secondly, that suitable habitat for each species, as identified during the habitat assessment, is present within the subject site, though compiling an accurate list has limitations (see Section 5 above) and therefore as

discussed, the listing is very likely to be an overestimation of the fauna species actually present onsite at any one time.

With respect to native vertebrate fauna, 10 mammal (including eight bat species), 102 bird, 25 reptile, eight frog and two fish species have previously been recorded in the wider area, some of which have the potential to occur in or utilise sections of the subject site at times. Thirteen species of introduced animals could also frequent the area.

Of the 147 native vertebrate animals that are listed as potentially occurring, four are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In one DBCA priority species is also listed as potentially occurring. These particular species are discussed in further detail in the following sections of the report.

## **6.2 SITE SURVEYS**

### **6.2.1 Fauna Habitat Assessment**

The subject site is situated on the eastern margin of the Swan Coastal Plain at the foot of the Darling Scarp in an area that has largely been cleared of vegetation, primarily for livestock grazing.

Remnant native vegetation within the subject site is now represented mainly by generally small groves of woodland/forest groves comprise of tree species in various densities and combinations including marri, banksia, flooded gum and paperbark over native understorey, introduced weeds or grasslands (~4.22% of the subject site). Riparian vegetation is mainly represented by a paperbark and flooded gum woodland over non-native groundcover bordering much of Yule Brook in the northern section of the subject site (~5.2 % of the subject site). The wetland vegetation present includes seasonally inundated shrublands with a low to medium shrub layer (2.97% of the subject site).





The balance of the subject site (~86.29% of the subject site) is either totally cleared or parkland cleared with scattered trees, mostly planted non-endemic eucalyptus species, with a small number of endemics (e.g. marri, jarrah and flooded gum).

The subject site shows no significant topographical features and is characterised by having a gentle slope from about 9 mAHD in the west to about 25 mAHD in the east. Soils within the subject site are mainly represented by white grey to brown sandy clays of the Guildford Formation.




In addition to the small areas of naturally vegetated seasonally inundated wetlands and Yule Brook the subject site contains a small number of manmade dams and ornamental lakes.



Descriptions and examples images of the main fauna habitats/dominant vegetation present within the subject site are provided in Table 1. The location and extent of the identified habitat elements is shown in Figure 3 (courtesy Emerge Associates 2018).





**Table 1: Main Fauna Habitats within the Subject Site**




Code	Fauna Habitat Description	Example Image
<b>Woodland/Forest (10.68 ha – 4.22%)</b>		
<b>Bac</b>	<p>Low woodland <i>Banksia</i> spp. and occasional <i>Nuytsia floribunda</i> and <i>Allocasuarina fraseriana</i> over open shrubland <i>Adenanthos cygnorum</i> and <i>Xanthorrhoea preissii</i> over non-native open grassland.</p> <p>Total Area = ~1.37 ha (~1.32%)</p>	
<b>Cc</b>	<p>Woodland to open forest <i>Corymbia calophylla</i> over closed grassland of introduced species.</p> <p>Total Area = ~2.72 ha (~1.08%)</p>	
<b>CcEd</b>	<p>Woodland of <i>Eucalyptus decipiens</i> and <i>Corymbia calophylla</i> over open shrubland <i>Xanthorrhoea preissii</i> over open sedge and forbland with grassland of introduced species</p> <p>Total Area = ~0.57 ha (~0.23%)</p>	
<b>CcHa</b>	<p>Open forest <i>Corymbia calophylla</i> over open shrubland <i>Hypocalymma angustifolium</i> over non-native grassland</p> <p>Total Area = ~0.07 ha (~0.03%)</p>	






Code	Fauna Habitat Description	Example Image
<b>CcXp</b>	<p>Open woodland <i>Corymbia calophylla</i> with scattered <i>Nuytsia floribunda</i> over open shrubland <i>Xanthorrhoea preissii</i> over forbland and introduced grassland.</p> <p>Total Area = ~1.46 ha (~0.58%)</p>	
<b>Erc</b>	<p>Low open forest of <i>Eucalyptus rudis</i> and <i>Eucalyptus camaldulensis</i> (and hybrids) over low open shrubland of <i>Pericalymma ellipticum</i>, <i>Verticordia densiflora</i> and open sedge/forbland over grassland introduced species.</p> <p>Total Area = ~0.22 ha (~0.09%)</p>	
<b>KaXp</b>	<p>Sparse woodland of <i>Nuytsia floribunda</i> over shrubland <i>Xanthorrhoea preissii</i> and <i>Kingia australis</i> over native and introduced forbland.</p> <p>Total Area = ~0.38 ha (~0.15%)</p>	
<b>MpDs</b>	<p>Low open forest of <i>Melaleuca preissiana</i> over sedgeland of <i>Dielsia stenostachya</i> and open herbs</p> <p>Total Area = ~0.89 ha (~0.35%)</p>	<p>No image available</p>

Code	Fauna Habitat Description	Example Image
<b>MLc</b>	<p>Shrubland <i>Melaleuca raphiophylla</i> and <i>M. viminea</i> subsp. <i>Vimineae</i> over low rushland <i>Leptocarpus canus</i> and grassland <i>Eragrostis curvula</i>.</p> <p>Total Area = ~0.22 ha (~0.09%)</p>	
<b>MpLI</b>	<p>Open woodland <i>Melaleuca preissiana</i> (some occurrences also with <i>M. raphiophylla</i>) over open sedge and rushland <i>Lepidosperma longitudinale</i>, <i>Schoenus rigens</i> and <i>Cyathochaeta teretifolia</i> and sparse herbs (understorey dominated by weeds in degraded areas)</p> <p>Total Area = ~2.49 ha (~0.98%)</p>	<p>No image available</p>
<b>MpPcAc</b>	<p>Low open woodland <i>Melaleuca preissiana</i> over shrubland <i>Pericalymma ellipticum</i>, <i>Adenanthos cygnorum</i> and <i>Hypocalymma angustifolium</i> over sedges, rushes and forbs.</p> <p>Total Area = ~0.29 ha (~0.11%)</p>	
<b>Riparian Vegetation (13.15 ha – 5.20%)</b>		
<b>ErAo</b>	<p>Low open woodland of <i>Eucalyptus rudis</i> and <i>Allocasuarina obesa</i> over shrubland of <i>Melaleuca lateritia</i>.</p> <p>Total Area = ~0.17 ha (~0.07%)</p>	<p>No image available</p>
<b>MaCp</b>	<p>Tall shrubland <i>Melaleuca</i> spp., <i>Acacia</i> spp., and <i>Callitris pyramidalis</i> over mixed sedges, rushes and herbs.</p> <p>Total Area = ~2.43 ha (~0.96%)</p>	<p>No image available</p>

Code	Fauna Habitat Description	Example Image
<b>Mer</b>	<p>Low woodland of <i>Eucalyptus rudis</i> and <i>Melaleuca raphiophylla</i> over closed non-native forbland often dominated by *<i>Cenchrus macrourus</i>.</p> <p>Borders Yule Brook.</p> <p>Total Area = ~3.71 ha (~1.47%)</p>	
<b>MrErCp</b>	<p>Occasional <i>Eucalyptus rudis</i> over tall shrubland <i>Melaleuca</i> spp. And <i>Callitris pyramidalis</i> over closed forbland <i>Watsonia meriana</i>.</p> <p>Borders Yule Brook.</p> <p>Total Area = ~6.84 ha (~2.70%)</p>	
<b>Wetlands (10.85 ha – 2.97%)</b>		
<b>AIHa</b>	<p>Low shrubland <i>Acacia lasiocarpa</i> and <i>Hypocalymma angustifolium</i> over rushland of <i>Leptocarpus canus</i> (or layer absent in degraded areas) over non-native grassland *<i>Eragrostis curvula</i> over mixed forbland.</p> <p>Total Area = ~3.34 ha (~1.32%)</p>	
<b>CpM</b>	<p>Shrubland <i>Melaleuca</i> spp. and <i>Callitris pyramidalis</i> over rush and sedgeland <i>Chaetanthus aristatus</i> and <i>Leptocarpus canus</i> and mixed forbland.</p> <p>Total Area = ~0.32 ha (~0.13%)</p>	

Code	Fauna Habitat Description	Example Image
<b>HaBtCa</b>	<p>Tall open shrubland of <i>Viminaria juncea</i> over shrubland of <i>Hypocalymma angustifolium</i>, <i>Melaleuca</i> spp. and <i>Banksia telmatiaea</i> over sedge/rushland <i>Chaetanthus aristatus</i>, <i>Leptocarpus canus</i> and <i>Mesomelaena tetragona</i>.</p> <p>Total Area = ~0.53 ha (~0.21%)</p>	
<b>Mha</b>	<p>Shrubland <i>Melaleuca</i> spp. over low shrubland <i>Acacia</i> spp and <i>Hypocalymma angustifolium</i> over mixed forbs, sedges and rushes (understorey dominated by weeds in degraded areas).</p> <p>Total Area = ~4.73 ha (~1.87%)</p>	
<b>MshHa Km</b>	<p>Shrubland of <i>Melaleuca seriata</i>, <i>Hypocalymma angustifolium</i> and <i>Kunzea micrantha</i> over diverse sedges, rushes and herbs.</p> <p>Total Area = ~0.75 ha (~0.30%)</p>	<p>No image available</p>
<b>PeHa</b>	<p>Open tall shrubland of <i>Viminaria juncea</i> over low shrubland <i>Pericalymma ellipticum</i> and <i>Hypocalymma angustifolium</i> over diverse sedges and forbs.</p> <p>Total Area = ~0.12 ha (~0.05%)</p>	

Code	Fauna Habitat Description	Example Image
<b>TiC</b>	<p>Low shrubland <i>Tecticornia indica</i> subsp. <i>Bidens</i> over forbland <i>Centrolepis</i> spp., *<i>Moraea flaccida</i> and *<i>Eragrostis curvula</i>.</p> <p>Total Area = ~0.62 ha (~0.25%)</p>	
<b>VjAILc</b>	<p>Open to closed shrubland of <i>Viminaria juncea</i> over low shrubland <i>Acacia lasiocarpa</i> and <i>Hypocalymma angustifolium</i> over forbland <i>Stylidium</i> spp.</p> <p>Total Area = ~0.39 ha (~0.15%)</p>	
<b>VjLI</b>	<p>Open shrubland of <i>Viminaria juncea</i> over sedgeland of <i>Lepidosperma longitudinale</i> and open herbland.</p> <p>Total Area = ~0.05 ha (~0.02%)</p>	<p>No image available</p>
<b>Non-native/hardstand (218.25 ha – 86.29%)</b>		
<b>Non-Native</b>	<p>Heavily disturbed areas comprising weeds with occasional native shrubs and planted vegetation or areas of hardstand or bare ground.</p> <p>Total Area = ~218.25 ha (~86.29%)</p>	

Overall fauna habitat values at the subject site have been severely compromised by the removal of most of the original native vegetation and the degradation of remnant patches. Most areas lack any natural attributes and are now only utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats. As a consequence, the fauna diversity of

the subject site is well below levels present prior to historical disturbances having occurred. Despite the lack of biodiversity the site still retains value for some species of conservation significance, in particular black cockatoos (foraging and roosting opportunities) and the quenda.

The individual remnant native trees and groves of trees, while limited in extent support the primary fauna habitat value although these areas vary in quality, with most areas being totally degraded and lacking significant native groundcover/shrubs and microhabitats such as hollow logs.

Yule Brook is also highly degraded but has some value as an ecological linkage which provides a corridor for wildlife movement (albeit tenuous at some points) across the subject site.

## 6.2.2 Black Cockatoo Habitat Assessment

### 6.2.2.1 Black Cockatoo Habitat Tree Assessment

Trees considered potentially suitable for black cockatoos to use as nesting habitat (subject to a suitable hollow being present and other factors) which were found within the subject site are comprised of the following species:

- Marri – *Corymbia calophylla*;
- Flooded Gum – *Eucalyptus rudis*;
- Jarrah – *Eucalyptus marginata*; and
- Tuart – *Eucalyptus gomphocephala* (planted specimens only).

A summary of the potential black cockatoo breeding trees (using DotEE criteria i.e. any suitable tree species with a DBH  $\geq$  50cm (Commonwealth of Australia 2012)) observed within the subject site is provided in Table 2 below and their location shown in Figure 5.

**Table 2: Summary of potential cockatoo breeding habitat trees (DBH  $\geq$ 50cm)**

Total Number of Habitat Trees	Number of Trees with <u>No Hollows</u> Observed	Number of Trees with Hollows Considered <u>Unsuitable</u> for Nesting Black Cockatoos	Number of Trees with Hollows Considered <u>Possibly Suitable</u> for Nesting Black Cockatoos	Tree Species			
				Marri	Flooded Gum	Jarrah	Tuart (Planted)
84	82	2	0	70	4	3	7

The assessment identified a total of 84 trees with a DBH of  $\geq 50$ cms within the subject site. Eighty two of the trees (82, ~97.6%) were not observed to contain hollows of any size. Two (2, ~38.7%) trees contained one or more possible hollows considered by the Author not to be suitable for black cockatoos to use for nesting purposes.

No trees were identified as potentially containing hollows suitable for black cockatoos to use for nesting purposes.

Additional details on each habitat tree observed can be found in Appendix D.

While there appears to be a paucity of breeding data for the general area this could simply be a consequence of a lack of survey work or a lack of publicly available data. The forest red-tailed black cockatoo commonly occurs in the local area as a breeding resident, with nesting almost certainly occurring within 15 km of the MKSEA. A known breeding site is located within 2 km of the subject site (Tony Kirkby pers. comm.) Carnaby's black cockatoo also commonly occurs in the local area but as a regular (non-breeding) seasonal migrant. Baudin's black cockatoo has a strong preference for the Darling Range and Darling Scarp but has been known to move out on to the eastern edge of the Swan Coastal Plain. Of the three species, this is the least likely to occur at the MKSEA and the least likely to breed within the local area (Bancroft *et al.* 2017).

Based on available vegetation mapping it is estimated that there is approximately 15,755 ha of native vegetation within 12 km the subject site (~29% of total area) much of which is likely to contain potential breeding habitat. There are also extensive areas (>50,000 ha in total) of potential black cockatoo habitat in various national/regional parks and state forest areas in the wider area (360 Environmental 2012).

Given the apparent lack of actual nesting trees and the presence of a relatively small number of "potential" breeding habitat trees, any proposed development within the subject site is unlikely to have significant direct or indirect impact on breeding black cockatoos and is also unlikely to significantly impact on the total "breeding habitat" resource available in the wider area.

#### **6.2.2.2 Black Cockatoo Foraging Habitat Assessment**

Following is a list of the main flora species recorded within the subject site during the fauna assessment that are known to be used as a direct food source (i.e. seeds or flowers) by one or more species of black cockatoo:

- Marri – *Corymbia calophylla*;
- Jarrah – *Eucalyptus marginata*;
- Tuart – *Eucalyptus gomphocephala*;
- Flooded Gum – *Eucalyptus rudis*;

- *Banksia* species;
- Sheoak – *Allocasuarina fraseriana*; and
- Balga – *Xanthorrhoea preissii*.

It should be noted that some of the above-mentioned species (e.g. flooded gum, tuart, and balga bush) are only foraged upon to a small degree compared to more favoured plant species (e.g. marri and *banksia*). The number of jarrah, banksia and sheoak trees present is also small. These plant species therefore do not contribute significantly to the total foraging resource present which is mainly represented by areas mapped as containing marri.

Foraging debris (all in the form of chewed marri fruits) left by black cockatoos was observed at several locations within the subject site during the survey period. This foraging activity was attributed to all three species based on the nature of chew marks on the marri fruits. Evidenced left by the forest red-tailed cockatoo was most prevalent.

Based on available vegetation mapping it is estimated that there is approximately 15,755 ha of native vegetation within 12 km the subject site (~29% of total area) much of which is likely to represent foraging habitat of some type. There are also extensive areas (>50,000 ha in total) of potential black cockatoo habitat in various national/regional parks and state forest areas in the wider area (360 Environmental 2012).

It is difficult to calculate the actual extent of quality natural foraging habitat within the subject site given it is largely comprised of patchy, fragmented vegetation, but it is unlikely to total more than about 6.19 ha (i.e. areas mapped as containing marri and *banksia* – see Figure 5). This area represents less than 0.0393% of the remnant native vegetation within 12 km of the subject site.

The results therefore suggest that the potential removal of some or all of the vegetation from the subject site is unlikely to have a significant impact on the availability of foraging resources for black cockatoos in the general area.

### 6.2.2.3 Black Cockatoo Roosting Habitat Assessment

Roosting activity by the forest red-tailed black cockatoo has been recorded within the subject site in the past (360 Environmental 2012) and the recent Great Cocky Count (GCC) coordinated by Birdlife Australia in April 2018 confirmed his same area was still in use as a roosting site. The locations of the observed roosting activity are shown in Figure 5. No other roosting activity within the subject site was noted during the most recent survey.

The area around Precinct 2 and 3B is also known to support black cockatoo roosting with a forest red-tailed black cockatoo roost site identified within the Precinct 3A area in 2017 (see Figure 5). This site was also being used during the 2018 GCC. Previously known



(or likely) roost locations from the Great Cocky Count database that are in the vicinity of the MKSEA are shown in Bancroft *et al.* 2017 - Figure 6.

The results therefore indicate that sections of the subject site support night roosting by the forest red-tailed black cockatoo at least for part of the year, and there is also potential for the other two black-cockatoo species to roost at the site.

### 6.2.3 Camera Traps

The complete results of the camera trapping carried out are provided within Appendix E. In total, 13 fauna species (native and introduced) were recorded. Of most interest was the recording of the Priority 4 (DBCA 2018a) quenda (*Isoodon fusciventer*) at six locations with Bush Forever Site 387.

Feral species recorded included a number of red fox (*Vulpes vulpes*) individuals, rabbits (*Oryctolagus cuniculus*), the house mouse (*Mus musculus*) and cats (*Felis catus*).

### 6.2.4 Acoustic Bat Recordings

Three bat species were recorded during the survey, these being:

- Gould's Wattled Bat – *Chalinolobus gouldii*;
- South Western Freetail Bat – *Ozimops kitcheneri*; and
- White-striped Freetail Bat – *Austronomus australis*.

All of the bats recorded are common widespread species.

### 6.2.5 Opportunistic Fauna Observations

Opportunistic fauna observations are listed in Appendix B. Including those species recorded on camera traps and during the bat call survey, a total of 51 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within the subject site during the survey period. Eight introduced species (red fox, rabbit, house mouse, cat, spotted turtle dove, laughing turtle dove, rainbow lorikeet and laughing kookaburra) were also recorded.

Most of the fauna species recorded were common, widespread bird species.

Besides those species already mentioned as having been recorded (i.e. the three black cockatoo species and quenda) no other fauna species of conservation significance were recorded during the survey period.

The habitat assessment and other observations made during the field reconnaissance survey suggests that the only other fauna species of conservation significance a likely to persist in the general area is the peregrine falcon (S7 – WC Act), through as it was not

recorded its status in the area is unknown. This species is relatively uncommon and has a large home range and therefore if it does occur it is only likely to be infrequently.

### 6.3 FAUNA INVENTORY – SUMMARY

#### 6.3.1 Vertebrate Fauna

Table 3 summarises the number of fauna species potentially occurring within or utilising at times the subject site, based on results from the literature review and observations made during the field assessment. A complete list of fauna possibly inhabiting or frequenting the subject site is located in Appendix B.

**Table 3: Summary of Potential Vertebrate Fauna Species (as listed in Appendix B)**

Group	Total number of Potential species	Potential number of Specially Protected species	Potential number of Migratory species	Potential number of Priority species	Number of species Observed: Field Survey 2017/18
Fish	3 <sup>1</sup>	0	0	0	0
Amphibians	8	0	0	0	0
Reptiles	25	0	0	0	2
Birds	108 <sup>6</sup>	4	0	0	49 <sup>4</sup>
Non-Volant Mammals	8 <sup>6</sup>	0	0	1	5 <sup>4</sup>
Volant Mammals (Bats)	8	0	0	0	3
<b>Total</b>	<b>160<sup>13</sup></b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>59<sup>8</sup></b>

Superscript = number of introduced species included in total.

Not all species listed as potentially occurring within the subject site in existing databases and publications (i.e. *EPBC Act* Threatened Fauna and Migratory species lists, DBCA’s NatureMap database, various reports and publications) are shown in the expected listing in Appendix B. Some species have been excluded from this list based largely on the lack of suitable habitat within the subject site and in the general area or known local extinction, even if suitable habitat is present.

Despite the omission of some species it should be noted that the list provided is still very likely an over estimation of the fauna species utilising the subject site (either on a regular

or infrequent basis) as a result of the precautionary approach adopted for the assessment. At any one time only a subset of the listed potential species are likely to be present within the bounds of the subject site.

As most of the subject site is cleared the majority represents unsuitable habitat for many of the potential species listed. Most, if present, would be confined to the small areas of remnant native bushland and even in these areas only a subset of the species listed are likely to be present at any one time.

### 6.3.2 Vertebrate Fauna of Conservation Significance

A review of the *EPBC Act* threatened fauna list, DBCA's Threatened Fauna Database and Priority List, unpublished reports and scientific publications identified a number of specially protected, priority or migratory vertebrate fauna species as potentially occurring in the general vicinity of the subject site. Of these species, most that have no potential whatsoever to utilise the subject site for any purpose have been omitted from the potential list (Appendix B), principally due to lack of suitable habitat (including extent and/or quality) or known local extinction.

In summary, four vertebrate fauna species of conservation significance were positively identified as utilising the subject site for some purpose during the survey period, these being:

- *Calyptorhynchus latirostris* Carnaby's Black Cockatoo – S2 (*WC Act*), Endangered (*EPBC Act*)  
Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species may roost within the subject site.
- *Calyptorhynchus banksii naso* Forest Red-tailed Black Cockatoo – S3 (*WC Act*), Vulnerable (*EPBC Act*)  
Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species is known to roost within the subject site.
- *Calyptorhynchus baudinii* Baudin's Black Cockatoo – S2 (*WC Act*), Endangered (*EPBC Act*)  
Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site

represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species may roost within the subject site.

- *Isoodon fusciventer* Quenda – P4 (DBCA Priority Species)  
This species was recorded at several locations on camera traps within Bush Forever Site 387 during the survey period. It has also previously been recorded along Yule Brook and in highly degraded sections of Precinct 3A which contained dense grass (Harewood 2016). It is therefore likely to persist in some paddocks with dense grasses and bush remnants with dense groundcover. Most of the subject site is however unsuitable for this species to use as habitat.

Based on the habitats present and current documented distributions it is considered possible that one additional species of conservation significance may use the subject site for some purpose at times, though, as no evidence of any using the subject site at the time of the field survey was found, the status of some in the area remains uncertain.

This species is:

- *Falco peregrinus* Peregrine Falcon – S7 (WC Act)  
This species potentially utilises some sections of the subject site as part of a much larger home range. No evidence of nesting was observed and the probability of this species breeding within the subject site can be considered to be very low.

As previously indicated a number of other species of conservation significance, while possibly present in the wider area (e.g. forested areas of the nearby Darling Range), are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas), lack of suitable habitat and/or the presence of feral predators. Details on conservation significant species and reasons for the omission of some from the potential listing are provided in Appendix D and Table 3.

Thirty bird species that potentially frequent or occur in the subject site are noted as Bush Forever Decreaser Species in the Perth Metropolitan Region (13 were sighted/identified as having used the within the subject site during the survey). Decreaser species are a significant issue in biodiversity conservation in the Perth section of the Swan Coastal Plain as there have been marked reductions in range and population levels of many sedentary bird species as a consequence of disturbance and land clearing (Dell & Hyder-Griffiths 2002).

### 6.3.3 Invertebrate Fauna of Conservation Significance

Five invertebrate species of conservation significance appeared in the DBCA or EPBC Act database searches (DBCA 2018b, DotEE 2018), these being an unnamed cricket (*Kawaniphila pachomai*), two unnamed bees (*Glossurocolletes bilobatus* & *Leioproctus douglasiellus*), the short-tongued bee (*Neopasiphae simplicior*) and Carter's freshwater mussel (*Westralunio carteri*).

The unnamed cricket (*Kawaniphila pachomai*) is considered unlikely to persist within the subject site due to its overall degraded nature and lack of the species favoured habitat.

Carter's freshwater mussel has been recorded relatively recently in the lower reaches of Yule Brook but the habitat within the subject itself appears too degraded/unsuitable for this species to persist.

Two of the unnamed bees (*Glossurocolletes bilobatus* & *Leioproctus douglasiellus*) have been recorded in the Greater Brixton Street Wetlands adjacent to the subject site (NatureMap records - 1981 and 2006 respectively). These species current status in this area is unknown. Neither species are however considered likely to persist within the subject site itself due to an apparent absence of suitable habitat (i.e. specific plant species on which the bees rely upon).

Additional information on each species can be found in Appendix F.

## **7. FAUNA VALUES**

### **7.1 CONSERVATION SIGNIFICANCE OF THE SUBJECT SITE**

The conservation significance of the subject site has been determined by applying site specific criteria such as:

- Fauna species and/or habitat present within the subject site that is poorly represented in the general vicinity;
- Fauna habitat within the subject site supporting species of conservation or other significance; and
- Fauna habitat within the subject site in better condition than other similar locations in the general vicinity.

The majority of the subject site is cleared and as a consequence the diversity of fauna species has been significantly reduced from its original natural levels. Habitat degradation as a result of partial clearing, altered fire regimes and the presence of introduced predators is also likely to have had a significant effect on species diversity in the remnants that remain. Because of these factors most of the site has very little conservation significance to fauna in general. This is to a certain extent supported by the fact that none of the vegetation remaining on site was selected for inclusion in bush forever while some nearby remnants were (Government of Western Australia 2000a).

The site does have some value principally as foraging habitat for black cockatoos but the extent of this vegetation, relative to that present in nearby reserved/national park areas, is relatively small. Some of the larger remnants are also likely to provide habitat for of native fauna species of conservation significance (e.g. quenda) in a largely cleared

landscape and the retention and ongoing management of these areas should be considered during development planning, though besides Yule Brook most are of a very small size and the high degree of fragmentation limits their long-term viability.

## **7.2 VALUE OF THE SUBJECT SITE AS AN ECOLOGICAL LINKAGE/WILDLIFE CORRIDOR**

Wildlife or ecological corridors are considered to provide avenues for the movement of individuals and populations of both flora and fauna. An ecological corridor is defined as 'habitat that permits the movement of organisms between ecological isolates' and linkage with adjacent bushland areas is therefore a natural attribute of high priority in the assessment of any sites significance. These corridors can be important for the survival of species as they provide access to feeding and breeding locations as well as access to other populations and therefore to a wider gene pool (Newmark 1993).

Within Bush Forever Volume 1 (Figure 6 - Government of Western Australia 2000a) conceptual "greenway" corridors are shown. The subject site is shown as forming part of recognised greenway corridor, the conceptual linkage following the path of the Yule Brook ultimately linking with the Canning River to the west of the subject site. The balance of the subject site, away from Yule Brook, has limited value in supporting the conceptual linkage given that it is almost totally cleared and only contains small fragments of degraded/highly degraded native vegetation.

It is important to maintain and improve Greenway corridors and other links between areas of ecological significance. This is necessary to maintain the diversity and vigour of ecological systems and to integrate areas of retained vegetation within the broader urban and industrial landscape.

Where possible, greenways should be incorporated into future planning proposals as part of the development of best practice planning and design solutions (Government of Western Australia 2000a).

## **8. POTENTIAL IMPACTS AND DEVELOPMENT CONSIDERATIONS**

### **8.1 POTENTIAL IMPACTS OF DEVELOPMENT**

In general the most significant impacts to fauna of any development include:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal (includes loss of hollow bearing trees);
- Fragmentation of vegetation/fauna habitat which may restrict the movement of some fauna species;

- Modifications to surface hydrology, siltation of creek lines;
- Changes to fire regimes;
- Pollution (e.g. oil spills);
- Noise/light/dust;
- Spread of plant pathogens (e.g. dieback) and weeds;
- Potential increase in the number of predatory introduced species (e.g. cats);
- Death or injury of fauna during clearing and construction; and
- An increase in fauna road kills subsequent to development.

The exact extent of development within the subject site is not known at this stage. However, assuming that the area is developed for light industrial purposes in accordance the City of Gosnell’s LSP it is expected that the majority of the remnant vegetation besides that retained in buffers along Yule Brook would be removed. Based on this assumption, possible impacts on specific species of conservation significance previously recorded in the general area is provided in the table below. Additional information on those species listed is provided in Appendix F.

**Table 4: Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance (continues on following pages).**

Common Name	Genus & Species	Conservation Status (See Appendix A for codes)	Habitat Present	Likelihood of Occurrence	Maximum Possible Impacts
Unnamed Cricket	<i>Kawaniphila pachomai</i>	P1	No	Would Not Occur.	No impact.
Unnamed Bee	<i>Glossurocolletes bilobatus</i>	P2	No	Would Not Occur.	No impact.
Short-tongued Bee	<i>Neopasiphae simplicior</i>	S2, CR	No	Would Not Occur.	No impact.
Unnamed Bee	<i>Leioproctus douglasiellus</i>	S2, CR	No	Would Not Occur.	No impact.
Carter’s Freshwater Mussel	<i>Westralunio carteri</i>	S3, VU	No	Unlikely to Occur.	No impact.
Perth Lined Lerista	<i>Lerista lineata</i>	P3	No	Would Not Occur.	No impact.
Darling Range Heath Ctenotus	<i>Ctenotus delli</i>	P4	No	Would Not Occur.	No impact.
Coastal Plains Skink	<i>Ctenotus ora</i>	P3	No	Would Not Occur.	No impact.
Black-striped Snake	<i>Neelaps calonotos</i>	P3	No	Would Not Occur.	No impact.
Southern Death Adder	<i>Acanthophis antarcticus</i>	P3	No	Would Not Occur.	No impact.

Common Name	Genus & Species	Conservation Status (See Appendix A for codes)	Habitat Present	Likelihood of Occurrence	Maximum Possible Impacts
Malleefowl	<i>Leipoa ocellata</i>	S3, VU	No	Would Not Occur. - species locally extinct.	No Impact.
Australasian Bittern	<i>Botaurus poiciloptilus</i>	S2, EN	No	Would Not Occur.	No impact.
Glossy Ibis	<i>Plegadis falcinellus</i>	S5, Mig	No	Unlikely to Occur.	No impact.
Painted Snipe	<i>Rostratula benghalensis</i>	S2, Mig, EN	No	Would Not Occur.	No impact.
Migratory Shorebirds/Wetland Species	Various	S5, Mig, Various	No	Would Not Occur.	No impact.
Blue-billed Duck	<i>Oxyura australis</i>	P4	No	Unlikely to Occur.	No impact.
Osprey	<i>Pandion haliaetus</i>	S5, Mig	No	Would Not Occur.	No impact.
Peregrine Falcon	<i>Falco peregrinus</i>	S7	Yes	Possible but only rarely.	Loss/modification of very small areas of degraded habitat. Significant impact not likely.
Fork-tailed Swift	<i>Apus pacificus</i>	S5, Mig	Yes	Unlikely to Occur, Flyover only on very rare occasions.	No impact.
Grey Wagtail	<i>Motacilla cinerea</i>	S5, Mig	No	Would Not Occur.	No impact.
Carnaby's Black Cockatoo	<i>Calyptorhynchus latirostris</i>	S2, EN	Yes	Known to Occur	Loss/modification of small areas of habitat. Significant impact not likely.
Baudin's Black Cockatoo	<i>Calyptorhynchus baudinii</i>	S2, EN	Yes	Known to Occur.	Loss/modification of small areas of habitat. Significant impact not likely.
Forest Red-tailed Black Cockatoo	<i>Calyptorhynchus banksii naso</i>	S3, VU	Yes	Known to Occur.	Loss/modification of small areas of habitat. Significant impact not likely.
Chuditch	<i>Dasyurus geoffroii</i>	S3, VU	No	Would Not Occur.	No impact.
South-western Brush-tailed Phascogale	<i>Phascogale tapoatafa wambenger</i>	S3	No	Unlikely to Occur.	No impact.
Quenda	<i>Isodon fusciventer</i>	P4	Yes	Known to Occur.	Loss/modification of small areas of habitat. Significant impact not likely.
Numbat	<i>Myrmecobius fasciatus</i>	S3, VU	No	Would Not Occur - species locally extinct.	No Impact.
Western Ringtail Possum	<i>Pseudocheirus occidentalis</i>	S2, VU	No	Would Not Occur - species locally extinct.	No Impact.
Woylie	<i>Bettongia penicillata ogibyi</i>	S1, EN	No	Would Not Occur - species locally extinct.	No Impact.
Quokka	<i>Setonix brachyurus</i>	S3, VU		Would Not Occur - species locally extinct.	



Common Name	Genus & Species	Conservation Status (See Appendix A for codes)	Habitat Present	Likelihood of Occurrence	Maximum Possible Impacts
Western Brush Wallaby	<i>Macropus irma</i>	P4	No	Would Not Occur.	No impact.
Water Rat	<i>Hydromys chrysogaster</i>	P4	No	Unlikely to Occur.	No impact.

## 8.2 CONSIDERATIONS FOR PLANNING AND DEVELOPMENT

With respect to vertebrate fauna in general, no significant impacts are anticipated as a consequence of development at the site. In cases where some impact is anticipated, the degree of the impact is only expected to be low and relates to the loss of small areas of habitat. As most species are common and widespread no overall change in their conservation status is anticipated, despite a possible localised reduction in habitat extent. There are substantial areas of similar habitat in nearby areas including some nature reserves/regional parks and most if, not all species likely to utilise the subject site will persist in these locations despite any future development.

The assessment does indicate that any considerations required during ongoing development planning would be limited to the presence of habitat used or potentially used by some threatened fauna species in particular those listed under the *EPBC Act*, namely the three species of black cockatoo.

The proposed development area is however made up of numerous individual lots with different landowners potentially undertaking “actions” as separate entities, and therefore possible “impacts” in each lot are likely to be assessed individually. The total number of “habitat” trees (84) and the extent of quality foraging habitat (~6.19 ha) is also relatively small compared to the extent of remnant native vegetation within 12 km of the subject site (~15,755 ha).

With this in mind it is considered highly unlikely that impacts on black cockatoos that may occur as a result of development at any scale within each individual landholding would be considered a “significant impact” as defined by the Commonwealth DotEE (DotE 2013).

While the retention of areas of vegetation potentially utilised by black cockatoos should be considered during the planning process, based on the assessment above it is not likely to represent a constraint to development in most lots.

This conclusion is primarily based on the fact that most of the individual lots are totally cleared or almost totally cleared of natural vegetation and therefore don’t contain significant areas of potential cockatoo habitat. Where some habitat is present it is limited in extent and patchy in distribution. Also, as previously indicated there are significant areas (~15,755 ha) of potential black cockatoo habitat with 12km of the subject site.

While some trees present within the subject site qualify as “potential breeding habitat” using DotEE criteria (Commonwealth of Australia 2012) the probability of any one tree actually developing hollows that would then be used by black cockatoos for breeding can be considered to be extremely low. The area is also unlikely to be considered of specific importance for the recovery of black cockatoos in the long term. For example the population growth of the Carnaby’s black-cockatoo is primarily limited by factors associated with breeding, and consequently priority areas for the recovery of the species are currently focused on known breeding sites (Cale 2003).

The presence of a known roost site within one lot will however need to be taken into consideration, though it is unclear if its removal would constitute “significant impact” as defined by the DotEE.

## 9. CONCLUSION

The fauna assessment within the subject site was undertaken for the purposes of categorising the fauna assemblages and identifying fauna habitats present. A targeted assessment of black cockatoo habitat within the area was also carried out.

With respect to native vertebrate fauna, 10 mammals (includes eight bat species), 102 bird, 25 reptile, eight frog and two fish species have previously been recorded in the general area, some of which have the potential to occur in or utilise sections of the subject site at times, a conclusion largely based on the presence of apparently suitable habitat.

Of the 147 native animals that are listed as potentially occurring in the area, four are considered to be endangered/vulnerable or in need of special protection under State and/or Commonwealth legislation, these being the three species of black cockatoo and the peregrine falcon. In addition, the Priority 4 quenda also occurs, though habitat for this species appears largely marginal in quality.

With respect to vertebrate fauna in general, no significant impacts are anticipated as a consequence of development at the site taking place. In cases where some impact is anticipated, the degree of the impact is only expected to be low and relates to the loss of small areas of habitat. As most species are common and widespread no overall change in their conservation status is anticipated, despite a possible localised reduction in habitat extent.

Based on available information it is considered, at this stage, very unlikely that impacts on black cockatoos (or any other *EPBC Act* listed threatened or migratory species) which may occur as a result of development at any scale within the subject site will result in a “significant impact” as defined by the Commonwealth DotEE (DotE 2013). The presence of a known roost site within one lot will however need to be taken into consideration, though it is unclear if its removal would constitute “significant impact” as defined by the DotEE. The conclusions drawn should be reviewed once development plans are finalised.

Subject to the proposal being it is recommended at that a fauna management plan be prepared for implementation during initial site works with the aim of minimising impacts on fauna and fauna habitat as much as reasonable and practicable.

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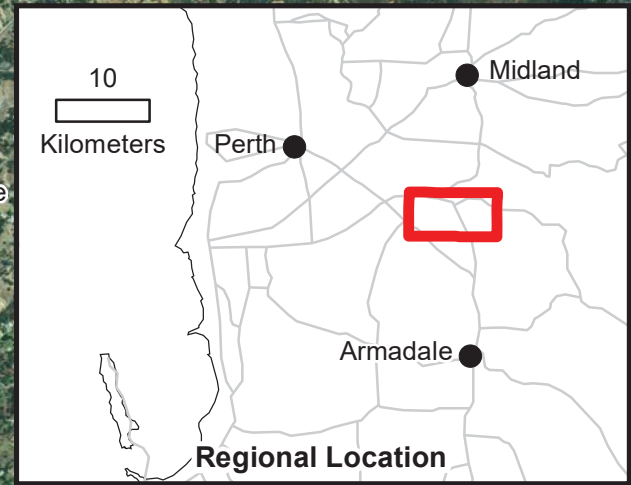
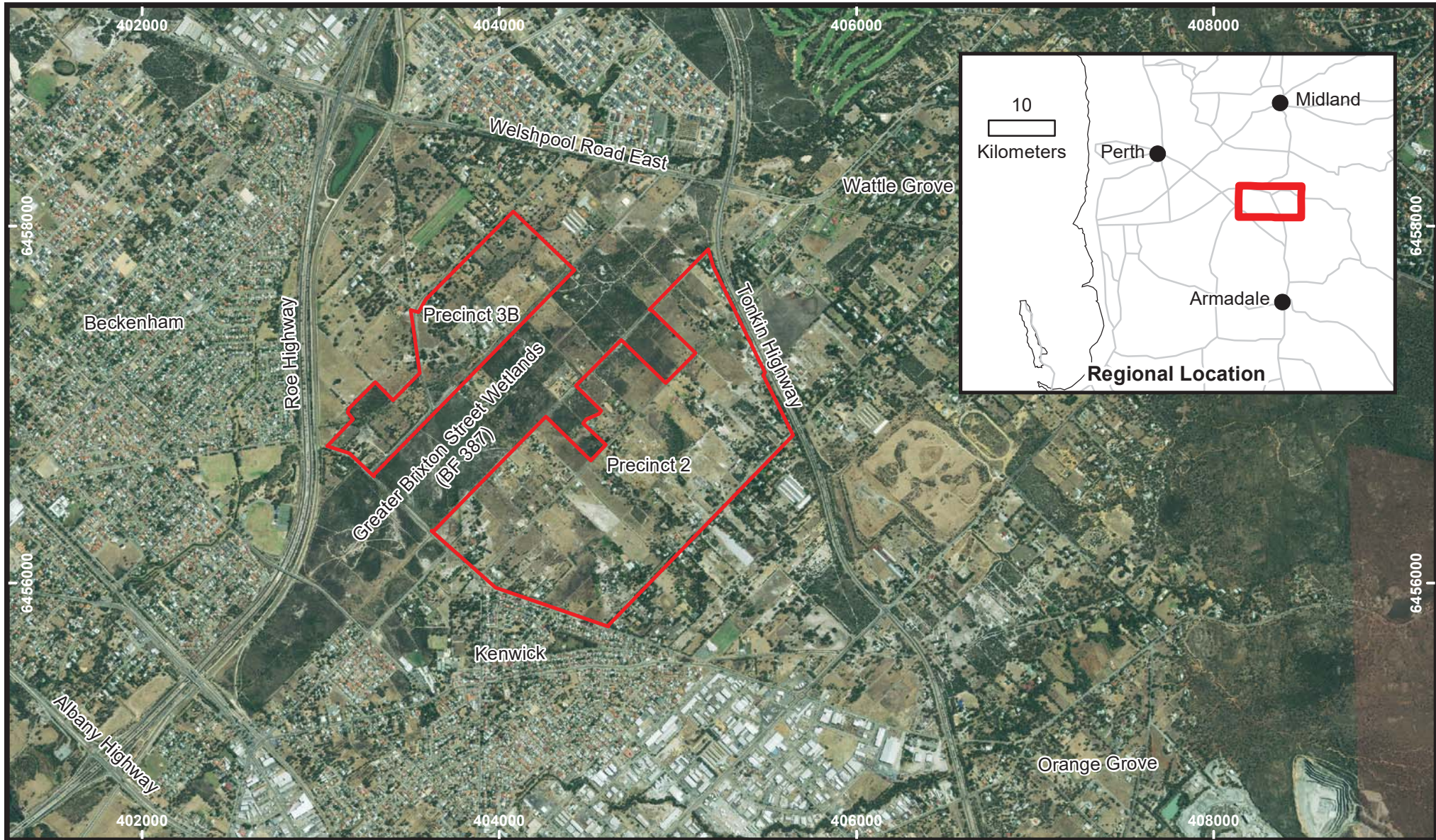
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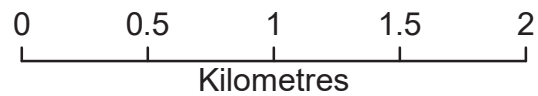
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# FIGURES



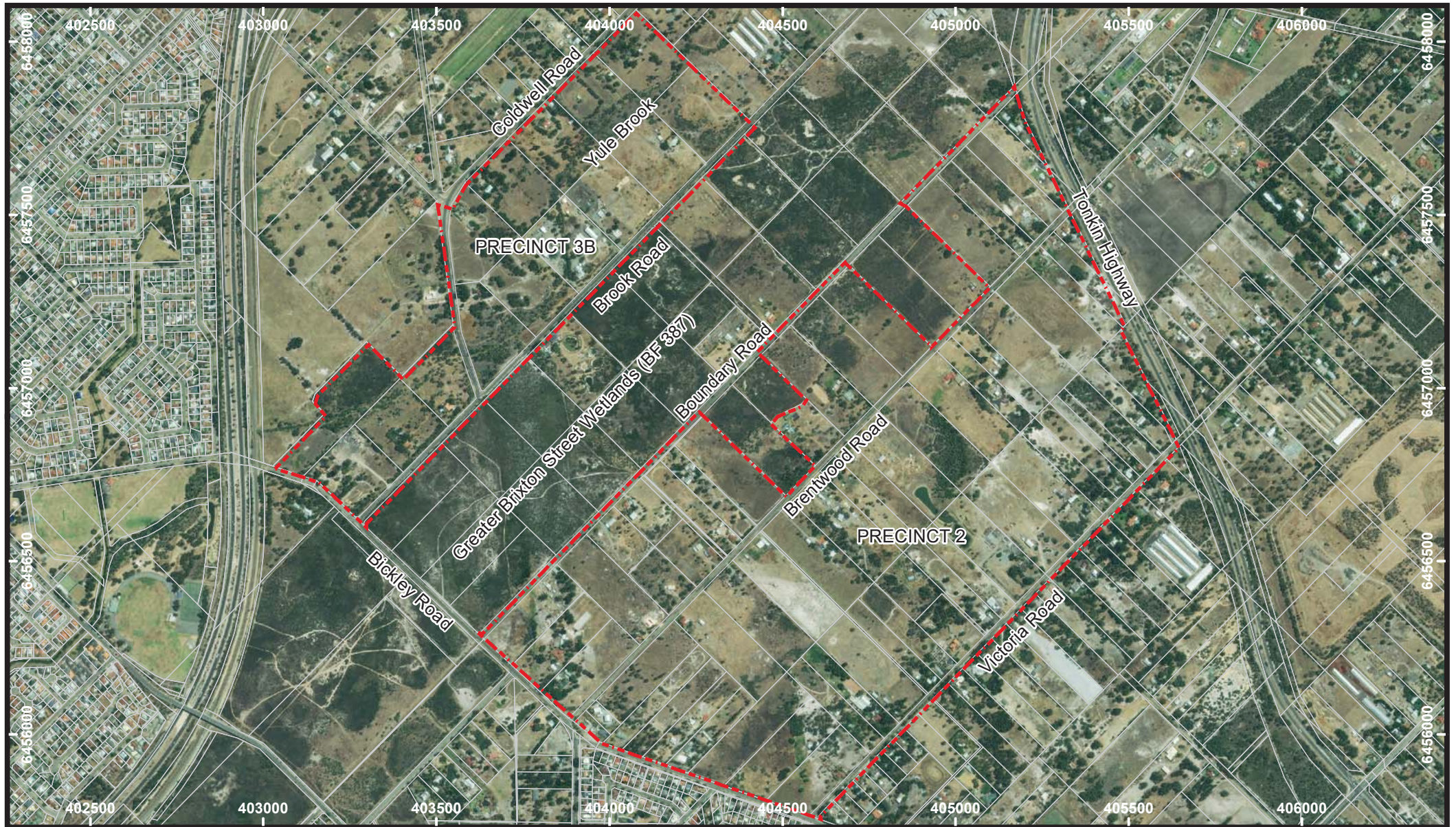
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- Precinct 2 and 3B
- Existing cadastral boundaries





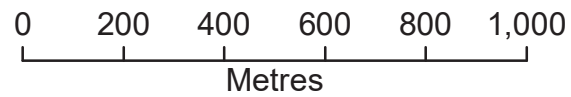
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**Maddington Kenwick Strategic  
 Employment Area  
 Precinct 2 and 3B  
 Subject Site  
 and  
 Surrounds**



**Legend**

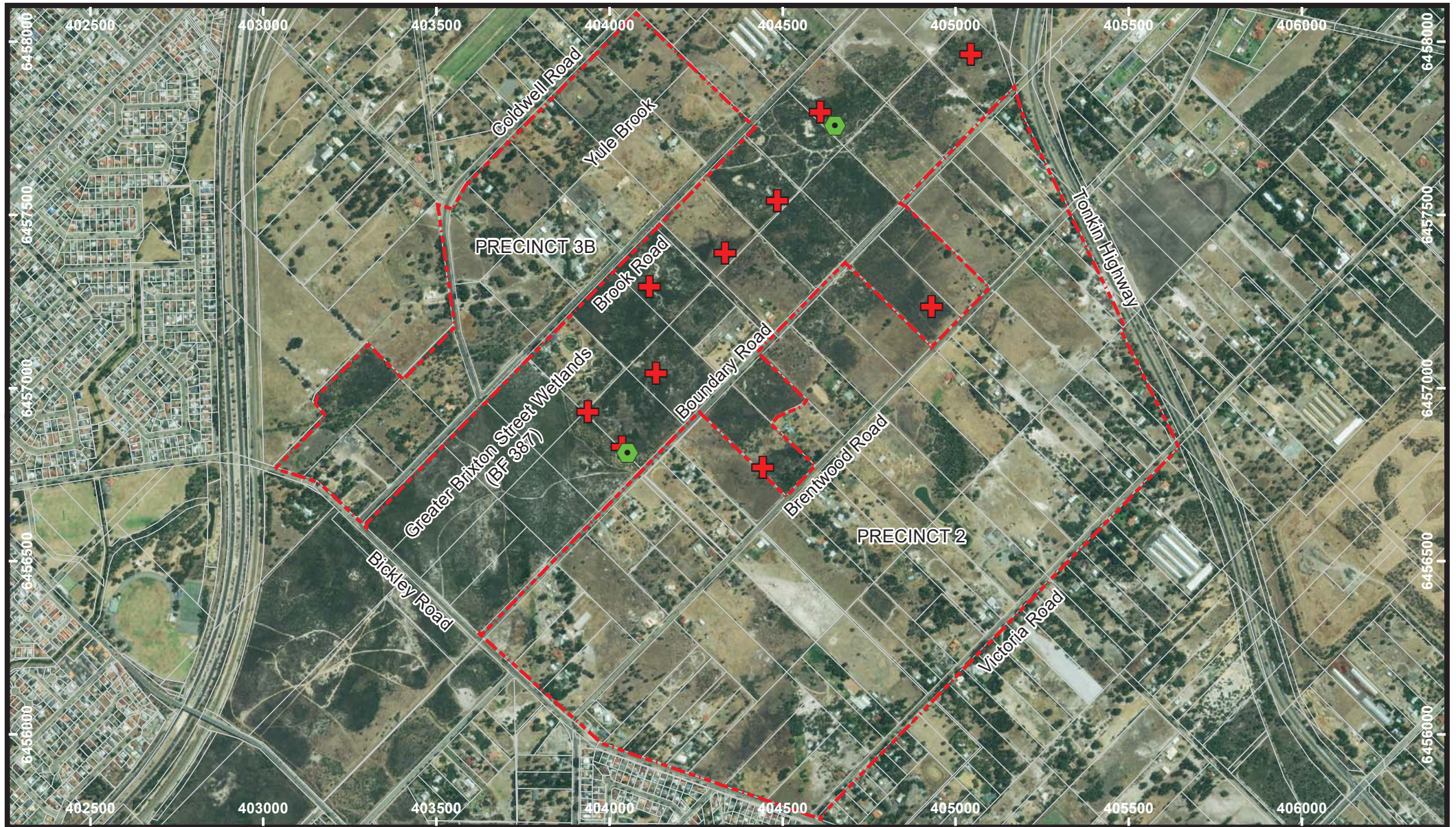
-  Existing cadastral boundaries
-  Precinct 2 and 3B Boundaries



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 Scale: 1:15,000  
 Projection/Coordinate System: UTM/MGA Zone 50

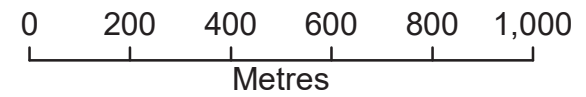
**Maddington Kenwick Strategic  
 Employment Area  
 Precinct 2 and 3B**

**Subject Site  
 Air Photo**



### Legend

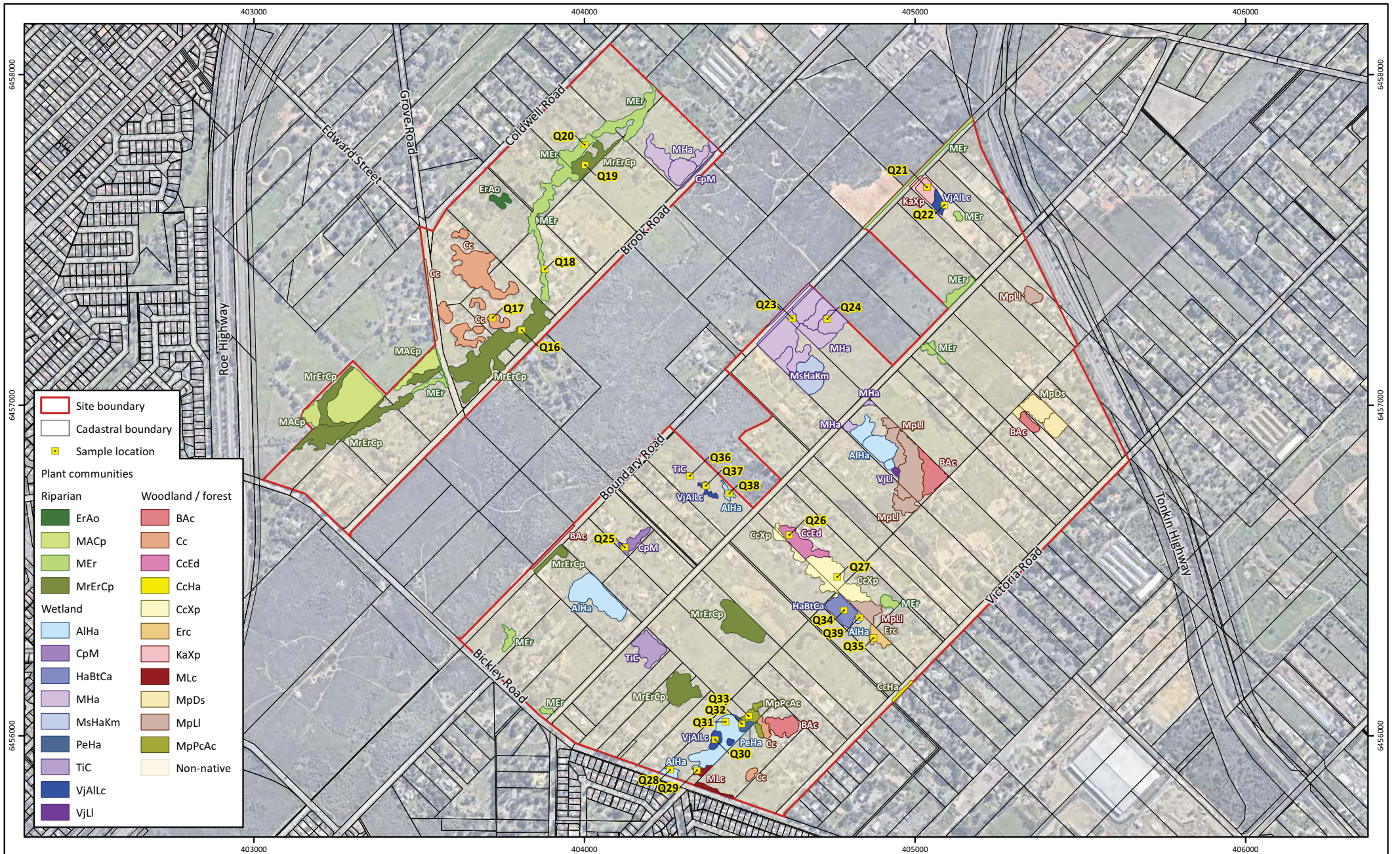
- Existing cadastral boundaries
- Precinct 2 and 3B Boundaries
- + Camera Trap Location
- ⬡ Bat Call Recording Location



Drawn: G Harewood  
 Date: May 2018  
 Scale: 1:15,000  
 Projection/Coordinate System: UTM/MGA Zone 50

**Maddington Kenwick Strategic  
 Employment Area  
 Precinct 2 and 3B**

### Recording Locations

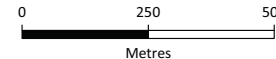


**Figure 4 : Plant Communities**

**Project:** Detailed Flora, Vegetation and Wetland Assessment  
Maddington Kenwick Strategic Employment Area Precincts 2 and 3

**Client:** City of Gosnells

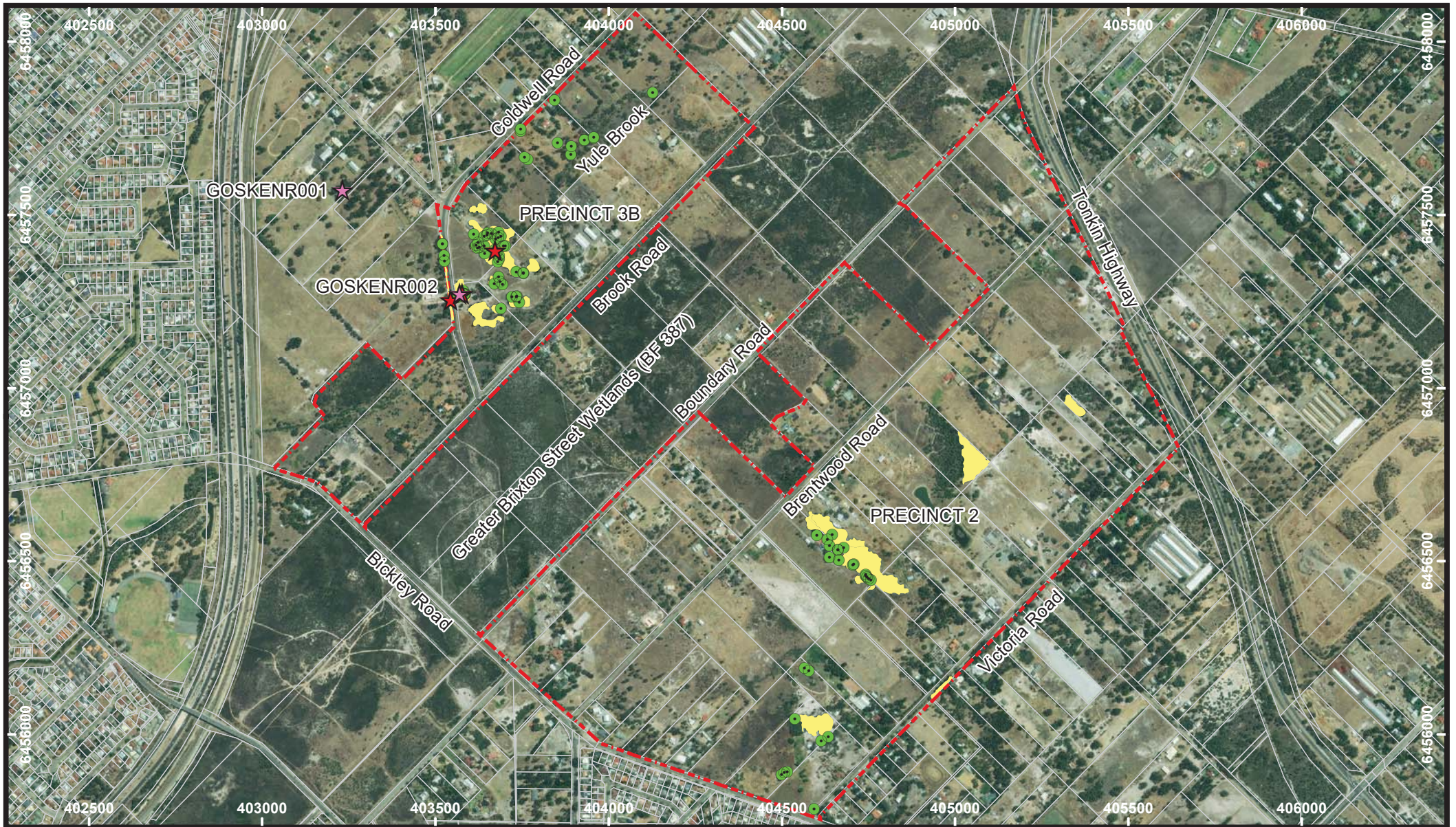
**Plan Number:** EP17-010(02)--F47  
**Drawn:** RAO  
**Date:** 06/04/2018  
**Checked:** DRAFT  
**Approved:** DRAFT  
**Date:** --/--/----








Scale: 1:15,000@A4  
GDA 1994 MGA Zone 50

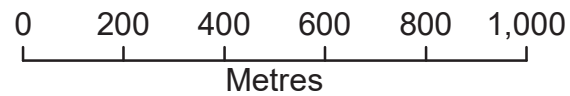


While Emmerge Associates makes every attempt to ensure the accuracy and completeness of data, Emmerge accepts no responsibility for externally sourced data used



### Legend

-  Existing cadastral boundaries
-  Precinct 2 and 3B Boundaries
-  Marri and Banksia Dominated Woodland
-  Habitat Tree (DBH >50cm)
-  Potential Roost Site (360 Environmental - 2012)
-  2018 GCC Roost Site (GOSKENR)



Drawn: G Harewood  
 Date: May 2018  
 Scale: 1:15,000

Maddington Kenwick Strategic  
 Employment Area  
 Precinct 2 and 3B

## Black Cockatoo Habitat

Projection/Coordinate System: UTM/MGA Zone 50

Figure: 5

# **APPENDIX A**

## **CONSERVATION CATEGORIES**



## EPBC Act (1999) Threatened Fauna Categories

Threatened fauna may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* in any one of the following categories:

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically Endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation Dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the <i>EPBC Act</i>

Note: Only species in those categories marked with an asterisk are matters of national environmental significance (NES) under the *EPBC Act*.

## Wildlife Conservation (Specially Protected Fauna) Notice 2017 Categories

Published as Specially Protected under the *Wildlife Conservation Act 1950*, and listed under Schedules 1 to 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

Category	Code	Description
Schedule 1  Critically Endangered species	CR	Threatened species considered to be facing an extremely high risk of extinction in the wild.
Schedule 2  Endangered species	EN	Threatened species considered to be facing a very high risk of extinction in the wild.
Schedule 3  Vulnerable species	VU	Threatened species considered to be facing a high risk of extinction in the wild.
Schedule 4  Presumed extinct species	EX	Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
Schedule 5  Migratory birds protected under an international agreement	IA	Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds.
Schedule 6  Fauna that is of special conservation need as conservation dependent fauna	CD	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
Schedule 7  Other specially protected fauna.	OS	Fauna otherwise in need of special protection to ensure their conservation.

## Western Australian DBCA Priority Fauna Categories

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Category	Code	Description
Priority 1 Poorly Known Species.	P1	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
Priority 2 Poorly Known Species.	P2	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3 Poorly Known Species.	P3	Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4 Rare, Near Threatened and other species in need of monitoring.	P4	(a) Rare: Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.  (b) Near Threatened: Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.  (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

\*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

## ***IUCN Red List Threatened Species Categories***

The *IUCN Red List of Threatened Species*<sup>™</sup> is a checklist of taxa that have undergone an extinction risk assessment using the *IUCN Red List Categories and Criteria*.

Categories are summarized below.

<b>Category</b>	<b>Code</b>	<b>Description</b>
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.
Not Evaluated	NE	Taxa which has not been evaluated.

A full list of categories and their meanings are available at:

<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>

# **APPENDIX B**

## **OBSERVED AND POTENTIAL VERTEBRATE FAUNA LISTING**

# Fauna Observed or Potentially in Subject Site

MKSEA Precinct 2 and 3B

Approximate centroid = 32.018364°S 115.984582°E

Compiled by Greg Harewood - May 2018

Recorded (Sighted/Heard/Signs/Captured) = X

A = Harewood, G. (2018). Fauna Assessment - Maddington Kenwick Strategic Employment Area Precinct 2 and 3B. Unpublished report for Emerge Associates.

B = Harewood, G. (2016). Fauna Assessment Maddington Kenwick Strategic Employment Area Precinct 3. Unpublished report for Emerge Associates.

C = Turpin, J. and Bamford, M. (2009). Keane Road Strategic Link Armadale, Fauna Assessment. Unpublished report for the EnviroWorks Consulting.

D = ATA Environmental (2006). Vertebrate Fauna Assessment Brookdale Redevelopment Area. Unpublished report for the Armadale Redevelopment Authority.

E = ENV Australia (2005). Southern River Precinct 3 - Environmental Review. Unpublished report for the City of Gosnells.

F = ATA (1994). A Report of a Fauna Survey of Perth Airport. Report 93/78. Unpublished report for the Federal Airports Corporation.

How, R.A (1995). Objection Assessment of Fauna Values for Perth Airport. Unpublished report for the Australian Heritage Commission.

Dell, J. (pers.comm) (1994). Results of Western Australia Museum Surveys, December 1986 to April 1990.

Robson and Chester (1989). Report on the Aquatic Fauna of Munday Swamp as an Indicator of Environmental Quality. Murdoch University.

Storey, A.W. et al (1993). Wetlands on the Swan Coastal Plain Volume 7. Waterbird Usage of Wetlands of the Swan Coastal Plain. EPA and Water Authority of WA.

G = DBCA (2018). NatureMap Database search. "By Circle" 115° 59' 20" E, 32° 01' 05" S – Subject Site (plus 10 km buffer). 18 April 2018.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Osteichthyes</b>						
<b>Galaxiidae</b>									
<i>Galaxias occidentalis</i>	Western Minnow							X	X
<b>Nannopercidae</b>									
<i>Edell vittata</i>	Western Pygmy Perch							X	
<b>Poeciliidae</b> Livebearers									
<i>Gambusia holbrooki</i>	Mosquito Fish	Introduced						X	

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Amphibia</b>						
<b>Myobatrachidae</b> Ground or Burrowing Frogs									
<i>Crinia georgiana</i>	Quacking Frog	LC				X			X
<i>Crinia glauerti</i>	Clicking Frog	LC				X	X	X	X
<i>Crinia insignifera</i>	Squelching Froglet	LC			X	X	X	X	X
<i>Geocrinia leai</i>	Ticking Frog	LC							
<i>Heleioporus eyrei</i>	Moaning Frog	LC				X	X	X	X
<i>Limnodynastes dorsalis</i>	Western Banjo Frog	LC			X	X	X	X	X
<b>Hylidae</b> Tree or Water-Holding Frogs									
<i>Litoria adelaidensis</i>	Slender Tree Frog	LC			X	X	X	X	X
<i>Litoria moorei</i>	Motorbike Frog	LC				X	X		X
<b>Reptilia</b>									
<b>Cheluidae</b> Side-necked Freshwater Turtles									
<i>Chelodina oblonga</i>	Oblong Turtle	LC					X	X	
<b>Gekkonidae</b> Geckoes									
<i>Christinus marmoratus</i>	Marbled Gecko					X			X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Pygopodidae</b> Legless Lizards						
<i>Aprasia repens</i>	Sandplain Worm Lizard					X			X
<i>Delma fraseri</i>	Fraser's Legless Lizard						X	X	X
<i>Delma grayii</i>	Side-barred Delma							X	X
<i>Lialis burtonis</i>	Burton's Legless Lizard					X	X	X	X
<b>Agamidae</b> Dragon Lizards									
<i>Pogona minor</i>	Western Bearded Dragon						X	X	X
<b>Varanidae</b> Monitor's or Goanna's									
<i>Varanus gouldii</i>	Gould's Sand Monitor		X		X	X	X	X	X
<i>Varanus rosenbergi</i>	Heath Monitor					X			X
<i>Varanus tristis</i>	Racehorse Monitor							X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.



Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Scincidae</b> Skinks						
<i>Acritoscincus trilineatum</i>	Southwestern Cool Skink					X	X	X	
<i>Cryptoblepharus buchananii</i>	Fence Skink					X	X	X	X
<i>Ctenotus australis</i>	Western Ctenotus					X	X	X	X
<i>Ctenotus fallens</i>	West Coast Ctenotus							X	X
<i>Ctenotus impar</i>	Odd-striped Ctenotus							X	X
<i>Egernia kingii</i>	King's Skink								X
<i>Hemiergis quadrilineata</i>	Two-toed Mulch Skink							X	X
<i>Lerista elegans</i>	West Coast Four-toed Lerista					X	X	X	X
<i>Menetia greyii</i>	Dwarf Skink					X	X	X	X
<i>Morethia lineocellata</i>	West Coast Pale-flecked Morethia					X			X
<i>Morethia obscura</i>	Shrubland Pale-flecked Morethia					X			X
<i>Tiliqua rugosa</i>	Bobtail		X		X	X	X	X	X
<b>Typhlopidae</b> Blind Snakes									
<i>Ramphotyphlops australis</i>	Southern Blind Snake					X		X	

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Elapidae</b> Elapid Snakes						
<i>Notechis scutatus</i>	Tiger Snake					X	X		X
<i>Pseudonaja affinis</i>	Dugite					X	X	X	X
<b>Aves</b>									
<b>Phasianidae</b> Quails, Pheasants									
<i>Coturnix pectoralis</i>	Stubble Quail	LC					X		
<i>Coturnix ypsilophora</i>	Brown Quail	LC				X			
<b>Anatidae</b> Geese, Swans, Ducks									
<i>Anas gracilis</i>	Grey Teal	LC	X			X	X	X	X
<i>Anas platyrhynchos</i>	Mallard	Introduced					X		X
<i>Anas superciliosa</i>	Pacific Black Duck	LC	X	X	X	X	X	X	X
<i>Chenonetta jubata</i>	Australian Wood Duck	LC	X	X	X	X	X	X	X
<i>Cygnus atratus</i>	Black Swan	LC						X	X
<i>Tadorna tadornoides</i>	Australian Shelduck	LC	X	X	X	X	X	X	X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G	
			<b>Podicipedidae</b> Grebes							
<i>Poliiocephalus poliocephalus</i>	Hoary-headed Grebe	LC								X
<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	LC						X		X
<b>Phalacrocoracidae</b> Cormorants										
<i>Phalacrocorax melanoleucos</i>	Little Pied Cormorant	LC						X		X
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant	LC						X		X
<b>Ardeidae</b> Herons, Egrets, Bitterns										
<i>Ardea alba</i>	Great Egret	CA JA						X		
<i>Ardea ibis</i>	Cattle Egret	CA JA								
<i>Ardea novaehollandiae</i>	White-faced Heron	LC	X			X	X	X		X
<i>Ardea pacifica</i>	White-necked Heron	LC				X	X			X
<b>Threskiornithidae</b> Ibises, Spoonbills										
<i>Platalea flavipes</i>	Yellow-billed Spoonbill	LC					X	X		X
<i>Threskiornis molucca</i>	Australian White Ibis	LC	X	X		X	X	X		
<i>Threskiornis spinicollis</i>	Straw-necked Ibis	LC	X	X	X		X	X		X

WC Act Status - S1 to S7, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DBCA Priority Status - P1 to P4, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and <http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria> for others.

Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Accipitridae</b> Kites, Goshawks, Eagles, Harriers						
<i>Accipiter cirrocephalus</i>	Collared Sparrowhawk	Bp LC						X	X
<i>Accipiter fasciatus</i>	Brown Goshawk	Bp LC	X				X	X	X
<i>Aquila audax</i>	Wedge-tailed Eagle	Bp LC					X	X	X
<i>Aquila morphnoides</i>	Little Eagle	Bp LC						X	
<i>Circus approximans</i>	Swamp Harrier	LC							X
<i>Circus assimilis</i>	Spotted Harrier	LC							X
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC	X				X	X	X
<i>Haliastur sphenurus</i>	Whistling Kite	Bp LC				X			X
<i>Hamirostra isura</i>	Square-tailed Kite	Bp LC							X
<b>Falconidae</b> Falcons									
<i>Falco berigora</i>	Brown Falcon	Bp LC	X	X		X		X	X
<i>Falco cenchroides</i>	Australian Kestrel	LC	X		X	X	X	X	X
<i>Falco longipennis</i>	Australian Hobby	LC							X
<i>Falco peregrinus</i>	Peregrine Falcon	S7 Bp LC							X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Rallidae</b> Rails, Crakes, Swamphens, Coots						
<i>Fulica atra</i>	Eurasian Coot	LC						X	X
<i>Gallinula tenebrosa</i>	Dusky Moorhen	Bh LC						X	X
<i>Gallirallus philippensis</i>	Buff-banded Rail	LC	X						X
<i>Porphyrio porphyrio</i>	Purple Swamphen	LC						X	X
<b>Turnicidae</b> Button-quails									
<i>Turnix varia</i>	Painted Button-quail	Bp LC	X						
<b>Recurvirostridae</b> Stilts, Avocets									
<i>Himantopus himantopus</i>	Black-winged Stilt	LC	X					X	X
<b>Charadriidae</b> Lapwings, Plovers, Dotterels									
<i>Charadrius melanops</i>	Black-fronted Dotterel	LC						X	

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
<b>Columbidae</b> Pigeons, Doves									
<i>Columba livia</i>	Domestic Pigeon	Introduced					X		X
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC			X	X	X	X	X
<i>Phaps chalcoptera</i>	Common Bronzewing	Bh LC	X		X	X	X	X	X
<i>Streptopelia chinensis</i>	Spotted Turtle-Dove	Introduced	X	X		X	X	X	X
<i>Streptopelia senegalensis</i>	Laughing Turtle-Dove	Introduced	X	X	X	X	X	X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Psittacidae</b> Parrots						
<i>Cacatua roseicapilla</i>	Galah	LC	X	X	X	X	X	X	X
<i>Cacatua sanguinea</i>	Little Corella	LC					X		X
<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black-Cockatoo	S3 VU Bp LC	X	X		X	X		
<i>Calyptorhynchus baudinii</i>	Baudin's Black-Cockatoo	S2 EN Bp EN A3cde	X						X
<i>Calyptorhynchus latirostris</i>	Carnaby's Black-Cockatoo	S2 EN Bp EN A2bcde	X	X		X	X	X	X
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet	LC							
<i>Neophema elegans</i>	Elegant Parrot	LC				X		X	X
<i>Platycercus icterotis icterotis</i>	Western Rosella (western ssp)	Bp LC							
<i>Platycercus spurius</i>	Red-capped Parrot	LC	X	X	X	X	X	X	X
<i>Platycercus zonarius semitorquatus</i>	Australian Ringneck Parrot	LC	X		X	X	X	X	
<i>Polytelis anthopeplus</i>	Regent Parrot	LC				X			
<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	Introduced	X	X	X	X	X		X

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Class Family Species	Common Name	Conservation Status							
			A	B	C	D	E	F	G
<b>Cuculidae</b>									
Parasitic Cuckoos									
<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo	LC				X		X	
<i>Chrysococcyx basalis</i>	Horsfield's Bronze Cuckoo	LC			X	X	X	X	
<i>Chrysococcyx lucidus</i>	Shining Bronze Cuckoo	LC	X		X	X	X	X	
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC			X			X	
<b>Strigidae</b>									
Hawk Owls									
<i>Ninox novaeseelandiae</i>	Boobook Owl	LC				X			
<b>Tytonidae</b>									
Barn Owls									
<i>Tyto alba</i>	Barn Owl	LC				X		X	
<b>Podargidae</b>									
Frogmouths									
<i>Podargus strigoides</i>	Tawny Frogmouth	LC				X		X	
<b>Halcyonidae</b>									
Tree Kingfishers									
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Introduced	X	X		X	X	X	
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC	X	X		X	X	X	
<b>Meropidae</b>									
Bee-eaters									
<i>Merops ornatus</i>	Rainbow Bee-eater	JA LC	X	X		X	X	X	

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
<b>Maluridae</b>									
Fairy Wrens, GrassWrens									
<i>Malurus splendens</i>	Splendid Fairy-wren	Bh LC	X		X	X	X	X	X
<b>Acanthizidae</b>									
Thornbills, Geryones, Fieldwrens & Whitefaces									
<i>Acanthiza apicalis</i>	Broad-tailed Thornbill	Bh LC			X	X	X	X	X
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	Bh LC	X	X	X	X	X	X	X
<i>Gerygone fusca</i>	Western Gerygone	LC	X	X	X	X	X	X	X
<i>Sericornis frontalis</i>	White-browed Scrubwren	Bh LC			X	X	X		X
<i>Smicrornis brevirostris</i>	Weebill	Bh LC	X	X	X	X			X
<b>Pardalotidae</b>									
Pardalotes									
<i>Pardalotus punctatus</i>	Spotted Pardalote	LC						X	X
<i>Pardalotus striatus</i>	Striated Pardalote	LC	X	X		X	X	X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Meliphagidae</b> Honeyeaters, Chats						
<i>Acanthorhynchus superciliosus</i>	Western Spinebill	LC			X		X	X	X
<i>Anthochaera carunculata</i>	Red Wattlebird	LC	X	X	X	X	X	X	X
<i>Anthochaera lunulata</i>	Western Little Wattlebird	Bp LC			X	X	X	X	X
<i>Epthianura albiglans</i>	White-fronted Chat	LC						X	
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC	X	X	X	X	X	X	
<i>Lichmera indistincta</i>	Brown Honeyeater	LC	X	X	X	X	X	X	X
<i>Manorina flavigula</i>	Yellow-throated Miner	LC							X
<i>Phylidonyris melanops</i>	Tawny-crowned Honeyeater	Bp LC			X			X	
<i>Phylidonyris nigra</i>	White-cheeked Honeyeater	Bp LC	X	X	X		X	X	
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	Bp LC	X		X		X	X	X
<b>Petroicidae</b> Australian Robins									
<i>Microeca fascinans</i>	Jacky Winter	LC							
<i>Petroica multicolor</i>	Scarlet Robin	Bh LC				X			
<b>Neosittidae</b> Sitellas									
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Bh LC						X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Pachycephalidae</b> Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers						
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Bh LC			X	X	X		X
<i>Pachycephala pectoralis</i>	Golden Whistler	Bh LC	X	X	X			X	
<i>Pachycephala rufiventris</i>	Rufous Whistler	LC			X	X	X	X	X
<b>Dicruridae</b> Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo									
<i>Grallina cyanoleuca</i>	Magpie-lark	LC	X	X	X	X	X	X	X
<i>Rhipidura fuliginosa</i>	Grey Fantail	LC	X	X	X	X	X	X	
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC	X	X	X	X	X	X	X
<b>Campephagidae</b> Cuckoo-shrikes, Trillers									
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC	X	X	X	X	X	X	X
<i>Lalage tricolor</i>	White-winged Triller	LC				X	X	X	X
<b>Artamidae</b> Woodswallows, Butcherbirds, Currawongs									
<i>Artamus cinereus</i>	Black-faced Woodswallow	Bp LC					X	X	X
<i>Artamus cyanopterus</i>	Dusky Woodswallow	Bp LC						X	X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Cracticidae</b> Currawongs, Magpies & Butcherbirds						
<i>Cracticus tibicen</i>	Australian Magpie	LC	X	X	X	X	X	X	X
<i>Cracticus torquatus</i>	Grey Butcherbird	LC	X	X	X	X	X	X	X
<b>Corvidae</b> Ravens, Crows									
<i>Corvus coronoides</i>	Australian Raven	LC	X	X	X	X	X	X	X
<b>Motacillidae</b> Old World Pipits, Wagtails									
<i>Anthus australis</i>	Australian Pipit	LC	X		X	X		X	X
<b>Dicaeidae</b> Flowerpeckers									
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC				X		X	X
<b>Hirundinidae</b> Swallows, Martins									
<i>Hirundo ariel</i>	Fairy Martin	LC						X	
<i>Hirundo neoxena</i>	Welcome Swallow	LC				X	X	X	X
<i>Hirundo nigricans</i>	Tree Martin	LC			X	X	X	X	
<b>Sylviidae</b> Old World Warblers									
<i>Cincloramphus cruralis</i>	Brown Songlark	LC	X					X	
<i>Cincloramphus mathewsi</i>	Rufous Songlark	LC						X	

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Zosteropidae</b> White-eyes						
<i>Zosterops lateralis</i>	Silvereeye	LC	X	X	X	X	X	X	X
<b>Mammalia</b>									
<b>Peramelidae</b> Bandicoots									
<i>Isoodon fusciventer</i>	Quenda	P4 LC	X	X	X	X	X	X	X
<b>Phalangeridae</b> Brush-tail Possums, Cuscuses									
<i>Trichosurus vulpecula</i>	Common Brush-tail Possum	LC				X			X
<b>Molossidae</b> Freetail Bats									
<i>Austronomus australis</i>	White-striped Freetail-bat	LC	X						
<i>Ozimops kitcheneri</i>	Southern Freetail-bat	LC	X						

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Vespertilionidae</b> Ordinary Bats						
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	LC	X			X			X
<i>Chalinolobus morio</i>	Chocolate Wattled Bat	LC							X
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	LC				X			X
<i>Nyctophilus gouldi</i>	Gould's Long-eared Bat	LC							
<i>Nyctophilus major major</i>	Western Long-eared Bat	LC							
<i>Vespadelus regulus</i>	Southern Forest Bat	LC							X
<b>Muridae</b> Rats, Mice									
<i>Mus musculus</i>	House Mouse	Introduced	X			X	X	X	X
<i>Rattus rattus</i>	Black Rat	Introduced				X		X	X
<b>Canidae</b> Dogs, Foxes									
<i>Canis lupus familiaris</i>	Dog	Introduced			X	X			
<i>Vulpes vulpes</i>	Red Fox	Introduced	X	X	X	X	X	X	X
<b>Felidae</b> Cats									
<i>Felis catus</i>	Cat	Introduced	X		X	X	X		X

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Class Family Species	Common Name	Conservation Status	A	B	C	D	E	F	G
			<b>Leporidae</b> Rabbits, Hares						
<i>Oryctolagus cuniculus</i>	Rabbit	Introduced	X	X	X	X	X	X	X

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# **APPENDIX C**

## **DBCA NATUREMAP & PROTECTED MATTERS SEARCH TOOL RESULTS**



# NatureMap - MKSEA P2

Created By Greg Harewood on 18/04/2018

**Kingdom** Animalia  
**Current Names Only** Yes  
**Core Datasets Only** Yes  
**Method** 'By Circle'  
**Centre** 115° 59' 20" E, 32° 01' 05" S  
**Buffer** 10km  
**Group By** Species Group

Species Group	Species	Records
Amphibian	12	437
Bird	227	37509
Fish	9	23
Invertebrate	246	981
Mammal	33	1038
Reptile	72	1066
<b>TOTAL</b>	<b>599</b>	<b>41054</b>

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
<b>Amphibian</b>				
1.	25398 <i>Crinia georgiana</i> (Quacking Frog)			
2.	25399 <i>Crinia glauerti</i> (Clicking Frog)			
3.	25400 <i>Crinia insignifera</i> (Squelching Froglet)			
4.	25401 <i>Crinia pseudinsignifera</i> (Bleating Froglet)			
5.	25409 <i>Heleioporus barycragus</i> (Hooting Frog)			
6.	25410 <i>Heleioporus eyrei</i> (Moaning Frog)			
7.	25412 <i>Heleioporus psammophilus</i> (Sand Frog)			
8.	25415 <i>Limnodynastes dorsalis</i> (Western Banjo Frog)			
9.	25378 <i>Litoria adelaidensis</i> (Slender Tree Frog)			
10.	25388 <i>Litoria moorei</i> (Motorbike Frog)			
11.	25420 <i>Myobatrachus gouldii</i> (Turtle Frog)			
12.	25433 <i>Pseudophryne guentheri</i> (Crawling Toadlet)			
<b>Bird</b>				
13.	24559 <i>Acanthagenys rufogularis</i> (Spiny-cheeked Honeyeater)			
14.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
15.	24261 <i>Acanthiza chrysorrhoa</i> (Yellow-rumped Thornbill)			
16.	24262 <i>Acanthiza inornata</i> (Western Thornbill)			
17.	24265 <i>Acanthiza uropygialis</i> (Chestnut-rumped Thornbill)			
18.	24560 <i>Acanthorhynchus superciliosus</i> (Western Spinebill)			
19.	25535 <i>Accipiter cirrocephalus</i> (Collared Sparrowhawk)			
20.	24281 <i>Accipiter cirrocephalus</i> subsp. <i>cirrocephalus</i> (Collared Sparrowhawk)			
21.	25536 <i>Accipiter fasciatus</i> (Brown Goshawk)			
22.	24283 <i>Accipiter fasciatus</i> subsp. <i>didimus</i> (Brown Goshawk)			
23.	24282 <i>Accipiter fasciatus</i> subsp. <i>fasciatus</i> (Brown Goshawk)			
24.	25755 <i>Acrocephalus australis</i> (Australian Reed Warbler)			
25.	24831 <i>Acrocephalus australis</i> subsp. <i>gouldi</i> (Australian Reed Warbler)			
26.	41323 <i>Actitis hypoleucos</i> (Common Sandpiper)		IA	
27.	24312 <i>Anas gracilis</i> (Grey Teal)			
28.	24313 <i>Anas platyrhynchos</i> (Mallard)			
29.	24315 <i>Anas rhynchotis</i> (Australasian Shoveler)			
30.	24316 <i>Anas superciliosa</i> (Pacific Black Duck)			
31.	47414 <i>Anhinga novaehollandiae</i> (Australasian Darter)			
32.	<i>Anser anser</i>			
33.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
34.	24562 <i>Anthochaera lunulata</i> (Western Little Wattlebird)			
35.	25670 <i>Anthus australis</i> (Australian Pipit)			
36.	24599 <i>Anthus australis</i> subsp. <i>australis</i> (Australian Pipit)			
37.	24285 <i>Aquila audax</i> (Wedge-tailed Eagle)			
38.	25557 <i>Ardea garzetta</i> (Little Egret)			
39.	25559 <i>Ardea intermedia</i> (Intermediate Egret)			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
40.	41324 <i>Ardea modesta</i> (great egret, white egret)		IA	
41.	24340 <i>Ardea novaehollandiae</i> (White-faced Heron)			
42.	24341 <i>Ardea pacifica</i> (White-necked Heron)			
43.	25560 <i>Ardea sacra</i> (Eastern Reef Egret, Eastern Reef Heron)			
44.	25566 <i>Artamus cinereus</i> (Black-faced Woodswallow)			
45.	24352 <i>Artamus cinereus</i> subsp. <i>melanops</i> (Black-faced Woodswallow)			
46.	24353 <i>Artamus cyanopterus</i> (Dusky Woodswallow)			
47.	24356 <i>Artamus personatus</i> (Masked Woodswallow)			
48.	24318 <i>Aythya australis</i> (Hardhead)			
49.	<i>Barnardius zonarius</i>			
50.	24319 <i>Biziura lobata</i> (Musk Duck)			
51.	24359 <i>Burhinus grallarius</i> (Bush Stone-curlew)			
52.	25713 <i>Cacatua galerita</i> (Sulphur-crested Cockatoo)			
53.	25714 <i>Cacatua pastinator</i> (Western Long-billed Corella)			
54.	25715 <i>Cacatua roseicapilla</i> (Galah)			
55.	25716 <i>Cacatua sanguinea</i> (Little Corella)			
56.	24729 <i>Cacatua tenuirostris</i> (Eastern Long-billed Corella)	Y		
57.	25598 <i>Cacomantis flabelliformis</i> (Fan-tailed Cuckoo)			
58.	42307 <i>Cacomantis pallidus</i> (Pallid Cuckoo)			
59.	25717 <i>Calyptorhynchus banksii</i> (Red-tailed Black-Cockatoo)			
60.	24731 <i>Calyptorhynchus banksii</i> subsp. <i>naso</i> (Forest Red-tailed Black-Cockatoo)		T	
61.	24733 <i>Calyptorhynchus baudinii</i> (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)		T	
62.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)		T	
63.	48400 <i>Calyptorhynchus</i> sp. (white-tailed black cockatoo)		T	
64.	24377 <i>Charadrius ruficapillus</i> (Red-capped Plover)			
65.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
66.	<i>Chroicocephalus novaehollandiae</i>			
67.	24431 <i>Chrysococcyx basalis</i> (Horsfield's Bronze Cuckoo)			
68.	25601 <i>Chrysococcyx lucidus</i> (Shining Bronze Cuckoo)			
69.	24432 <i>Chrysococcyx lucidus</i> subsp. <i>plagiosus</i> (Shining Bronze Cuckoo)			
70.	24288 <i>Circus approximans</i> (Swamp Harrier)			
71.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
72.	24774 <i>Cladorhynchus leucocephalus</i> (Banded Stilt)			
73.	25675 <i>Colluricincla harmonica</i> (Grey Shrike-thrush)			
74.	24613 <i>Colluricincla harmonica</i> subsp. <i>rufiventris</i> (Grey Shrike-thrush)			
75.	24399 <i>Columba livia</i> (Domestic Pigeon)	Y		
76.	24361 <i>Coracina maxima</i> (Ground Cuckoo-shrike)			
77.	25568 <i>Coracina novaehollandiae</i> (Black-faced Cuckoo-shrike)			
78.	24362 <i>Coracina novaehollandiae</i> subsp. <i>novaehollandiae</i> (Black-faced Cuckoo-shrike)			
79.	24363 <i>Coracina novaehollandiae</i> subsp. <i>subpallida</i> (Black-faced Cuckoo-shrike)			
80.	25592 <i>Corvus coronoides</i> (Australian Raven)			
81.	24417 <i>Corvus coronoides</i> subsp. <i>perplexus</i> (Australian Raven)			
82.	24420 <i>Cracticus nigrogularis</i> (Pied Butcherbird)			
83.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
84.	24422 <i>Cracticus tibicen</i> subsp. <i>dorsalis</i> (White-backed Magpie)			
85.	24423 <i>Cracticus tibicen</i> subsp. <i>tibicen</i> (Black-backed Magpie)			
86.	25596 <i>Cracticus torquatus</i> (Grey Butcherbird)			
87.	24424 <i>Cracticus torquatus</i> subsp. <i>torquatus</i> (Grey Butcherbird)			
88.	24322 <i>Cygnus atratus</i> (Black Swan)			
89.	30901 <i>Dacelo novaeguineae</i> (Laughing Kookaburra)	Y		
90.	25673 <i>Daphoenositta chrysoptera</i> (Varied Sittella)			
91.	24606 <i>Daphoenositta chrysoptera</i> subsp. <i>pileata</i> (Varied Sittella, Black-capped Sittella)			
92.	25607 <i>Dicaeum hirundinaceum</i> (Mistletoebird)			
93.	24470 <i>Dromaius novaehollandiae</i> (Emu)			
94.	<i>Egretta garzetta</i>			
95.	<i>Egretta novaehollandiae</i>			
96.	<i>Elanus axillaris</i>			
97.	25540 <i>Elanus caeruleus</i> (Black-shouldered Kite)			
98.	24290 <i>Elanus caeruleus</i> subsp. <i>axillaris</i> (Australian Black-shouldered Kite)			
99.	47937 <i>Elseymornis melanops</i> (Black-fronted Dotterel)			
100.	<i>Eolophus roseicapillus</i>			
101.	24651 <i>Eopsaltria australis</i> subsp. <i>griseogularis</i> (Western Yellow Robin)			
102.	24652 <i>Eopsaltria georgiana</i> (White-breasted Robin)			
103.	24379 <i>Erythronyctes cinctus</i> (Red-kneed Dotterel)			
104.	25621 <i>Falco berigora</i> (Brown Falcon)			
105.	25622 <i>Falco cenchroides</i> (Australian Kestrel, Nankeen Kestrel)			
106.	24472 <i>Falco cenchroides</i> subsp. <i>cenchrus</i> (Australian Kestrel, Nankeen Kestrel)			
107.	25623 <i>Falco longipennis</i> (Australian Hobby)			

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108.	25624 <i>Falco peregrinus</i> (Peregrine Falcon)		S	
109.	24475 <i>Falco peregrinus</i> subsp. <i>macropus</i> (Australian Peregrine Falcon)		S	
110.	25727 <i>Fulica atra</i> (Eurasian Coot)			
111.	24761 <i>Fulica atra</i> subsp. <i>australis</i> (Eurasian Coot)			
112.	25729 <i>Gallinula tenebrosa</i> (Dusky Moorhen)			
113.	24763 <i>Gallinula tenebrosa</i> subsp. <i>tenebrosa</i> (Dusky Moorhen)			
114.	25730 <i>Gallirallus philippensis</i> (Buff-banded Rail)			
115.	24765 <i>Gallirallus philippensis</i> subsp. <i>mellori</i> (Buff-banded Rail)			
116.	<i>Gallus gallus</i>			
117.	42314 <i>Gavicalis virescens</i> (Singing Honeyeater)			
118.	24401 <i>Geopelia cuneata</i> (Diamond Dove)			
119.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
120.	24271 <i>Gerygone fusca</i> subsp. <i>fusca</i> (Western Gerygone)			
121.	47962 <i>Glyciphila melanops</i> (Tawny-crowned Honeyeater)			
122.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
123.	24487 <i>Haematopus longirostris</i> (Pied Oystercatcher)			
124.	24295 <i>Haliastur sphenurus</i> (Whistling Kite)			
125.	24296 <i>Hamirostra isura</i> (Square-tailed Kite)			
126.	47965 <i>Hieraaetus morphnoides</i> (Little Eagle)			
127.	25734 <i>Himantopus himantopus</i> (Black-winged Stilt)			
128.	24491 <i>Hirundo neoxena</i> (Welcome Swallow)			
129.	<i>Hydroprogne caspia</i>			
130.	24367 <i>Lalage tricolor</i> (White-winged Triller)			
131.	25637 <i>Larus novaehollandiae</i> (Silver Gull)			
132.	24511 <i>Larus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Silver Gull)			
133.	25661 <i>Lichmera indistincta</i> (Brown Honeyeater)			
134.	24582 <i>Lichmera indistincta</i> subsp. <i>indistincta</i> (Brown Honeyeater)			
135.	<i>Lophoictinia isura</i>			
136.	24326 <i>Malacorhynchus membranaceus</i> (Pink-eared Duck)			
137.	25650 <i>Malurus elegans</i> (Red-winged Fairy-wren)			
138.	25651 <i>Malurus lamberti</i> (Variegated Fairy-wren)			
139.	24544 <i>Malurus lamberti</i> subsp. <i>assimilis</i> (Variegated Fairy-wren)			
140.	24551 <i>Malurus pulcherrimus</i> (Blue-breasted Fairy-wren)			
141.	25654 <i>Malurus splendens</i> (Splendid Fairy-wren)			
142.	24552 <i>Malurus splendens</i> subsp. <i>splendens</i> (Splendid Fairy-wren)			
143.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
144.	25758 <i>Megalurus gramineus</i> (Little Grassbird)			
145.	25663 <i>Melithreptus brevirostris</i> (Brown-headed Honeyeater)			
146.	24587 <i>Melithreptus chloropsis</i> (Western White-naped Honeyeater)			
147.	24598 <i>Merops ornatus</i> (Rainbow Bee-eater)		IA	
148.	<i>Microcarbo melanoleucos</i>			
149.	25610 <i>Myiagra inquieta</i> (Restless Flycatcher)			
150.	25686 <i>Neochmia temporalis</i> (Red-browed Finch)	Y		
151.	24738 <i>Neophema elegans</i> (Elegant Parrot)			
152.	24739 <i>Neophema petrophila</i> (Rock Parrot)			
153.	25747 <i>Ninox connivens</i> (Barking Owl)			
154.	25564 <i>Nycticorax caledonicus</i> (Rufous Night Heron)			
155.	24742 <i>Nymphicus hollandicus</i> (Cockatiele)			
156.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
157.	24328 <i>Oxyura australis</i> (Blue-billed Duck)		P4	
158.	25680 <i>Pachycephala rufiventris</i> (Rufous Whistler)			
159.	24624 <i>Pachycephala rufiventris</i> subsp. <i>rufiventris</i> (Rufous Whistler)			
160.	<i>Pandion cristatus</i>			
161.	25543 <i>Pandion haliaetus</i> (Osprey)		IA	
162.	25681 <i>Pardalotus punctatus</i> (Spotted Pardalote)			
163.	24625 <i>Pardalotus punctatus</i> subsp. <i>punctatus</i> (Spotted Pardalote)			
164.	24626 <i>Pardalotus punctatus</i> subsp. <i>xanthopyge</i> (Yellow-rumped Pardalote)			
165.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
166.	24628 <i>Pardalotus striatus</i> subsp. <i>murchisoni</i> (Striated Pardalote)			
167.	24630 <i>Pardalotus striatus</i> subsp. <i>westraliensis</i> (Striated Pardalote)			
168.	25687 <i>Passer domesticus</i> (House Sparrow)	Y		
169.	24648 <i>Pelecanus conspicillatus</i> (Australian Pelican)			
170.	48060 <i>Petrochelidon ariel</i> (Fairy Martin)			
171.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
172.	48066 <i>Petroica boodang</i> (Scarlet Robin)			
173.	24659 <i>Petroica goodenovii</i> (Red-capped Robin)			
174.	25697 <i>Phalacrocorax carbo</i> (Great Cormorant)			
175.	25698 <i>Phalacrocorax melanoleucos</i> (Little Pied Cormorant)			
176.	24667 <i>Phalacrocorax sulcirostris</i> (Little Black Cormorant)			
177.	25699 <i>Phalacrocorax varius</i> (Pied Cormorant)			

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178.	24409 <i>Phaps chalcoptera</i> (Common Bronzewing)			
179.	25587 <i>Phaps elegans</i> (Brush Bronzewing)			
180.	48071 <i>Phylidonyris niger</i> (White-cheeked Honeyeater)			
181.	24596 <i>Phylidonyris novaehollandiae</i> (New Holland Honeyeater)			
182.	24841 <i>Platalea flavipes</i> (Yellow-billed Spoonbill)			
183.	24842 <i>Platalea regia</i> (Royal Spoonbill)			
184.	25720 <i>Platycercus icterotis</i> (Western Rosella)			
185.	24745 <i>Platycercus icterotis</i> subsp. <i>icterotis</i> (Western Rosella)			
186.	24747 <i>Platycercus spurius</i> (Red-capped Parrot)			
187.	25721 <i>Platycercus zonarius</i> (Australian Ringneck, Ring-necked Parrot)			
188.	24750 <i>Platycercus zonarius</i> subsp. <i>semitorquatus</i> (Twenty-eight Parrot)			
189.	24751 <i>Platycercus zonarius</i> subsp. <i>zonarius</i> (Port Lincoln Parrot)			
190.	24843 <i>Plegadis falcinellus</i> (Glossy Ibis)		IA	
191.	25703 <i>Podargus strigoides</i> (Tawny Frogmouth)			
192.	24679 <i>Podargus strigoides</i> subsp. <i>brachypterus</i> (Tawny Frogmouth)			
193.	25704 <i>Podiceps cristatus</i> (Great Crested Grebe)			
194.	24681 <i>Poliiocephalus poliocephalus</i> (Hoary-headed Grebe)			
195.	25731 <i>Porphyrio porphyrio</i> (Purple Swamphen)			
196.	24767 <i>Porphyrio porphyrio</i> subsp. <i>bellus</i> (Purple Swamphen)			
197.	24769 <i>Porzana fluminea</i> (Australian Spotted Crake)			
198.	25732 <i>Porzana pusilla</i> (Baillon's Crake)			
199.	24770 <i>Porzana pusilla</i> subsp. <i>palustris</i> (Baillon's Crake)			
200.	24771 <i>Porzana tabuensis</i> (Spotless Crake)			
201.	24702 <i>Pterodroma brevirostris</i> (Kerguelen Petrel)			
202.	24703 <i>Pterodroma lessonii</i> (White-headed Petrel)			
203.	25710 <i>Pterodroma macroptera</i> (Great-winged Petrel)			
204.	24711 <i>Puffinus assimilis</i> subsp. <i>assimilis</i> (Little Shearwater)			
205.	<i>Purpureicephalus spurius</i>			
206.	24776 <i>Recurvirostra novaehollandiae</i> (Red-necked Avocet)			
207.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
208.	25614 <i>Rhipidura leucophrys</i> (Willie Wagtail)			
209.	24454 <i>Rhipidura leucophrys</i> subsp. <i>leucophrys</i> (Willie Wagtail)			
210.	25534 <i>Sericornis frontalis</i> (White-browed Scrubwren)			
211.	30948 <i>Smicronis brevirostris</i> (Weebill)			
212.	24645 <i>Stagonopleura oculata</i> (Red-eared Firetail)			
213.	24523 <i>Sterna caspia</i> (Caspian Tern)		IA	
214.	24525 <i>Sterna fuscata</i> subsp. <i>nubilosa</i> (Sooty Tern)			
215.	24329 <i>Stictonetta naevosa</i> (Freckled Duck)			
216.	25655 <i>Stipiturus malachurus</i> (Southern Emu-wren)			
217.	25597 <i>Strepera versicolor</i> (Grey Currawong)			
218.	24426 <i>Strepera versicolor</i> subsp. <i>plumbea</i> (Grey Currawong)			
219.	25589 <i>Streptopelia chinensis</i> (Spotted Turtle-Dove)	Y		
220.	25590 <i>Streptopelia senegalensis</i> (Laughing Turtle-Dove)	Y		
221.	30950 <i>Streptopelia senegalensis</i> subsp. <i>senegalensis</i> (Laughing Turtle-Dove)	Y		
222.	25705 <i>Tachybaptus novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
223.	24682 <i>Tachybaptus novaehollandiae</i> subsp. <i>novaehollandiae</i> (Australasian Grebe, Black-throated Grebe)			
224.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
225.	<i>Thalasseus bergii</i>			
226.	24845 <i>Threskiornis spinicollis</i> (Straw-necked Ibis)			
227.	25549 <i>Todiramphus sanctus</i> (Sacred Kingfisher)			
228.	24309 <i>Todiramphus sanctus</i> subsp. <i>sanctus</i> (Sacred Kingfisher)			
229.	48141 <i>Tribonyx ventralis</i> (Black-tailed Native-hen)			
230.	25723 <i>Trichoglossus haematodus</i> (Rainbow Lorikeet)			
231.	24755 <i>Trichoglossus haematodus</i> subsp. <i>moluccanus</i> (Rainbow Lorikeet)	Y		
232.	24806 <i>Tringa glareola</i> (Wood Sandpiper)		IA	
233.	24808 <i>Tringa nebularia</i> (Common Greenshank, greenshank)		IA	
234.	48147 <i>Turnix varius</i> (Painted Button-quail)			
235.	24851 <i>Turnix velox</i> (Little Button-quail)			
236.	25762 <i>Tyto alba</i> (Barn Owl)			
237.	24852 <i>Tyto alba</i> subsp. <i>delicatula</i> (Barn Owl)			
238.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
239.	25765 <i>Zosterops lateralis</i> (Grey-breasted White-eye, Silvereye)			
<b>Fish</b>				
240.	<i>Afurcagobius suppositus</i>			
241.	<i>Anguilla australis</i>			
242.	<i>Bostockia porosa</i>			
243.	<i>Carassius auratus</i>			
244.	<i>Cleidopus gloriamaris</i>			
245.	34028 <i>Galaxias occidentalis</i> (Western Minnow)			

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246.	<i>Nannoperca vittata</i>			
247.	<i>Phalloceros caudimaculatus</i>			
248.	<i>Urocampus carinirostris</i>			
<b>Invertebrate</b>				
249.	<i>Acercella falcipes</i>			
250.	<i>Aganippe raphiduca</i>			
251.	<i>Agraptocorixa parvipunctata</i>			
252.	<i>Ainudrilus nharna</i>			
253.	<i>Akamptogonus novarae</i>			
254.	<i>Alboa worooa</i>			
255.	<i>Allodessus bistrigatus</i>			
256.	<i>Allothereua maculata</i>			
257.	<i>Alona affinis</i>			
258.	<i>Alona cf. guttata</i>			
259.	<i>Alona rigidicaudis</i>			
260.	<i>Alona setigera</i>			
261.	<i>Alonella clathratula</i>			
262.	<i>Aname mainae</i>			
263.	<i>Aname tepperi</i>			
264.	<i>Ancylidae sp.</i>			
265.	<i>Anisops thienemanni</i>			
266.	<i>Anopheles annulipes s.l.</i>			
267.	<i>Apsectrotanypus nr maculosa</i>			
268.	<i>Arachnura higginsi</i>			
269.	<i>Araneus cyphoxis</i>			
270.	<i>Araneus eburneiventris</i>			
271.	<i>Araneus eburnus</i>			
272.	<i>Araneus senicaudatus</i>			
273.	<i>Araneus talipedatus</i>			
274.	<i>Argiope trifasciata</i>			
275.	<i>Arrenurus (Micruracarus) sp. 1 (SAP)</i>			
276.	<i>Artema atlanta</i>			
277.	<i>Artonia linnaei</i>			
278.	<i>Artonia taeniifera</i>			
279.	<i>Artoniopsis eccentrica</i>			
280.	<i>Artoniopsis exposita</i>			
281.	<i>Artoniopsis joergi</i>			
282.	<i>Asadipus kunderang</i>			
283.	<i>Austracantha minax</i>			
284.	<i>Austrammo harveyi</i>			
285.	<i>Austrolestes analis</i>			
286.	<i>Austrolestes io</i>			
287.	<i>Backobourkia heroine</i>			
288.	<i>Badumna insignis</i>			
289.	<i>Ballarra longipalpus</i>			
290.	<i>Bennelongia sp.</i>			
291.	<i>Berosus approximans</i>			
292.	<i>Berosus australiae</i>			
293.	<i>Bezzia sp.</i>			
294.	<i>Bezzia sp. 2 (SAP)</i>			
295.	<i>Boeckella bispinosa</i>			
296.	<i>Brachionus quadridentatus</i>			
297.	<i>Caenidae sp.</i>			
298.	<i>Candonocypris novaezealandiae</i>			
299.	<i>Ceinidae sp.</i>			
300.	<i>Celaenia excavata</i>			
301.	<i>Cephalodella gibba</i>			
302.	<i>Ceratopogonidae sp.</i>			
303.	<i>Cercophonius granulatus</i>			
304.	<i>Cercophonius sulcatus</i>			
305.	<i>Ceriodaphnia sp.</i>			
306.	<i>Ceryerda cursitans</i>			
307.	<i>Chaoboridae sp.</i>			
308.	33939 <i>Cherax cainii (Marron)</i>			
309.	<i>Cherax destructor</i>			
310.	<i>Cherax preissii</i>			
311.	<i>Cherax quinquecarinatus</i>			
312.	<i>Chironominae sp.</i>			
313.	<i>Chydorus sp.</i>			
314.	<i>Coenagrionidae sp.</i>			

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315.	<i>Corixidae</i> sp.			
316.	<i>Cormocephalus aurantiipes</i>			
317.	<i>Cormocephalus novaehollandiae</i>			
318.	<i>Cormocephalus rubriceps</i>			
319.	<i>Cormocephalus strigosus</i>			
320.	<i>Cormocephalus turneri</i>			
321.	<i>Corynoneura</i> sp. (V49) (SAP)			
322.	<i>Cricotopus 'brevicornis'</i>			
323.	<i>Cryptochironomus griseidorsum</i>			
324.	<i>Cryptoerithus quobba</i>			
325.	<i>Culex (Culex) annulirostris</i>			
326.	<i>Culicoides</i> sp.			
327.	<i>Cyclosa trilobata</i>			
328.	<i>Cypretta</i> sp.			
329.	<i>Cyprinotus cingalensis</i>			
330.	<i>Delena cancerides</i>			
331.	<i>Diaphanosoma</i> sp.			
332.	<i>Dingosa murata</i>			
333.	<i>Dingosa serrata</i>			
334.	<i>Dinocambala ingens</i>			
335.	<i>Diptera</i> sp.			
336.	<i>Dolichopodidae</i> sp.			
337.	<i>Dunhevedia crassa</i>			
338.	<i>Dytiscidae</i> sp.			
339.	<i>Ephydriidae</i> sp.			
340.	<i>Eriophora biapicata</i>			
341.	<i>Euchlanis</i> sp.			
342.	<i>Eucyrtops latior</i>			
343.	<i>Eupograptus kottae</i>			
344.	<i>Eurytion incisunguis</i>			Y
345.	<i>Eylais</i> sp.			
346.	<i>Gea theridioides</i>			
347.	<i>Glacidorbidae</i> sp.			Y
348.	<i>Glyptophysa</i> sp.			
349.	<i>Gripopterygidae</i> sp.			
350.	<i>Gyrinidae</i> sp.			
351.	<i>Hallplus gibbus</i>			
352.	<i>Hebridae</i> sp.			
353.	<i>Hemianax papuensis</i>			
354.	<i>Hemicloea</i> sp.			Y
355.	<i>Hemicordulia tau</i>			
356.	<i>Hemicordulidae</i> sp.			
357.	<i>Henicops dentatus</i>			
358.	<i>Hoggicosa storri</i>			
359.	<i>Hogna crispipes</i>			
360.	<i>Hogna immansueta</i>			
361.	<i>Holasteron perth</i>			
362.	<i>Holasteron wamuseum</i>			Y
363.	<i>Holconia westralia</i>			
364.	<i>Holocnemus pluchei</i>			
365.	<i>Hydrophilidae</i> sp.			
366.	<i>Hydropsychidae</i> sp.			
367.	<i>Hydroptilidae</i> sp.			
368.	<i>Idiommatia blackwalli</i>			
369.	<i>Idiosoma hirsutum</i>			
370.	<i>Ilyocypris</i> sp.			
371.	<i>Ilyodromus</i> sp.			
372.	<i>Isidorella</i> sp.			
373.	<i>Isopeda leishmanni</i>			
374.	<i>Isopeda magna</i>			
375.	<i>Isopedella cana</i>			
376.	<i>Ixodes australiensis</i>			
377.	<i>Kangarosa properipes</i>			
378.	<i>Karaops ellenae</i>			
379.	<i>Karaops jarrit</i>			
380.	33980 <i>Kawaniphila pachomai</i> (cricket)		P1	
381.	<i>Lacrimicypris "drummondii" n.sp.</i> (SAP)			
382.	<i>Lampona cylindrata</i>			
383.	<i>Latonopsis brehmi</i>			
384.	<i>Latrodectus hasseltii</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
385.	<i>Leberis aenigmatica</i>			
386.	33981 <i>Leioproctus bilobatus</i> (short-tongued bee)		P2	
387.	33983 <i>Leioproctus douglasiellus</i> (short-tongued bee)		T	
388.	<i>Leptoceridae</i> sp.			
389.	<i>Libellulidae</i> sp.			
390.	<i>Limbodessus shuckhardi</i>			
391.	<i>Limnadia</i> sp.			
392.	<i>Limnochares australica</i>			
393.	<i>Limnophyes vestitus</i> (V41)			
394.	<i>Longepi woodman</i>			
395.	<i>Lycidas chlorophthalmus</i>			
396.	<i>Lycosa ariadnae</i>			
397.	<i>Lycosa godeffroyi</i>			
398.	<i>Lynceus</i> sp.			
399.	<i>Macrothrix</i> sp.			
400.	<i>Maratus pavonis</i>			
401.	<i>Maraura macracantha</i> (formerly <i>Alona macracantha</i> )			
402.	<i>Masasteron maini</i>			
403.	<i>Megaporus</i> sp.			
404.	<i>Mesocyclops brooksi</i>			
405.	<i>Microcyclops varicans</i>			
406.	<i>Microvelia</i> sp.			
407.	<i>Missulena granulosa</i>			
408.	<i>Missulena hoggi</i>			
409.	<i>Missulena occatoria</i>			
410.	<i>Mituliodon tarantulinus</i>			
411.	<i>Mitzoruga insularis</i>			
412.	<i>Monohelea</i> sp. 1 (SAP)			
413.	<i>Monohelea</i> sp. 2 (SAP)			
414.	<i>Myandra bicincta</i>			
415.	<i>Myandra cambridgei</i>			
416.	<i>Nematoda</i> sp.			
417.	33984 <i>Neopasiphae simplicior</i> (short-tongued bee)		T	
418.	<i>Nephila edulis</i>			
419.	<i>Nicodamus mainae</i>			
420.	<i>Notiasemus glauerti</i>			
421.	<i>Notonectidae</i> sp.			
422.	<i>Occiperipatoides gilesii</i>			
423.	<i>Oecobius navus</i>			
424.	<i>Oligochaeta</i> sp.			
425.	<i>Ommatoiulus moreleti</i>			
426.	<i>Ommatoiulus moreletii</i>			
427.	<i>Onychohydrus</i> sp.			
428.	<i>Oribatida</i> sp.			
429.	<i>Orthoclaadiinae</i> sp.			
430.	<i>Orthoclaadiinae</i> sp. C = V44 <i>Gymnometriocnemus</i> (SAP)			
431.	<i>Ostearius melanopygius</i>			
432.	<i>Oxidus gracilis</i>			
433.	<i>Oxyopes gracilipes</i>			
434.	<i>Palaemonidae</i> sp.			
435.	<i>Paralampona marangaroo</i>			
436.	<i>Paramerina levidensis</i>			
437.	<i>Paramphisopus palustris</i>			
438.	<i>Parastacidae</i> sp.			
439.	<i>Phenasteron longiconductor</i>			
440.	<i>Pholcus phalangioides</i>			
441.	<i>Phreatoicidae</i> sp.			
442.	<i>Phryganoporus candidus</i>			
443.	<i>Phryganoporus gausapatus</i> subsp. <i>occidentalis</i>			Y
444.	<i>Physidae</i> sp.			
445.	<i>Pinkfloydia harveii</i>			
446.	<i>Planicirclus alticarinatus</i>			
447.	<i>Planorbidae</i> sp.			
448.	<i>Poltys laciniosus</i>			
449.	<i>Polygonarea repanda</i>			Y
450.	<i>Procladius paludicola</i>			
451.	<i>Procladius</i> sp. (normal claws)			
452.	<i>Raveniella cirrata</i>			
453.	<i>Raveniella peckorum</i>			
454.	<i>Rhantus suturalis</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
455.	<i>Scolopendra laeta</i>			
456.	<i>Scolopendra morsitans</i>			
457.	<i>Simocephalus elizabethae</i>			
458.	<i>Simuliidae</i> sp.			
459.	<i>Solaenodolichopus pruvoti</i>			
460.	<i>Spencerhydrus</i> sp.			Y
461.	<i>Sphaerotrichopus ramosus</i>			
462.	<i>Steatoda capensis</i>			
463.	<i>Steatoda grossa</i>			
464.	<i>Sternopriscus</i> sp.			
465.	<i>Storena formosa</i>			
466.	<i>Storena sinuosa</i>			
467.	<i>Supunna funerea</i>			
468.	<i>Supunna picta</i>			
469.	<i>Synothele durokoppin</i>			
470.	<i>Synothele rastelloides</i>			
471.	<i>Synsphyronus magnus</i>			
472.	<i>Tabanidae</i> sp.			
473.	<i>Tamopsis facialis</i>			
474.	<i>Tamopsis perthensis</i>			
475.	<i>Tanypodinae</i> sp.			
476.	<i>Tanytarsus fuscithorax</i>			
477.	<i>Tasmanicosa leuckartii</i>			
478.	<i>Tegenaria atrica</i>			Y
479.	<i>Testudinella patina</i>			
480.	<i>Tetragnatha demissa</i>			
481.	<i>Tipulidae</i> sp.			
482.	<i>Trichocerca similis</i>			
483.	<i>Trichocycclus balladong</i>			
484.	<i>Tripletides australis</i>			
485.	<i>Turbellaria</i> sp.			
486.	<i>Urodacus novaehollandiae</i>			
487.	<i>Urodacus planimanus</i>			
488.	<i>Urodacus woodwardii</i>			
489.	<i>Venator immansueta</i>			
490.	<i>Venatrix arenaris</i>			
491.	<i>Venatrix pullastra</i>			
492.	34113 <i>Westralunio carteri</i> (Carter's Freshwater Mussel)		T	
493.	<i>Westrarchaea spinosa</i>			
494.	<i>Zachria flavicoma</i>			

**Mammal**

495.	24088 <i>Antechinus flavipes</i> subsp. <i>leucogaster</i> (Yellow-footed Antechinus, Mardo)			
496.	24162 <i>Bettongia penicillata</i> subsp. <i>ogilbyi</i> (Woylie, Brush-tailed Bettong)		T	
497.	24251 <i>Bos taurus</i> (European Cattle)	Y		
498.	25454 <i>Canis lupus</i> (Dog, Dingo)	Y		
499.	30883 <i>Canis lupus</i> subsp. <i>familiaris</i> (Dog)	Y		
500.	24186 <i>Chalinolobus gouldii</i> (Gould's Wattle Bat)			
501.	24187 <i>Chalinolobus morio</i> (Chocolate Wattle Bat)			
502.	24092 <i>Dasyurus geoffroyi</i> (Chuditch, Western Quoll)		T	
503.	24041 <i>Felis catus</i> (Cat)	Y		
504.	30916 <i>Funambulus pennanti</i> (Indian Palm Squirrel)	Y		
505.	24215 <i>Hydromys chrysogaster</i> (Water-rat, Rakali)		P4	
506.	25478 <i>Isoodon obesulus</i> (Southern Brown Bandicoot)		P4	
507.	24153 <i>Isoodon obesulus</i> subsp. <i>fusciventer</i> (Quenda, Southern Brown Bandicoot)		P4	
508.	24132 <i>Macropus fuliginosus</i> (Western Grey Kangaroo)			
509.	24133 <i>Macropus irma</i> (Western Brush Wallaby)		P4	
510.	24223 <i>Mus musculus</i> (House Mouse)	Y		
511.	24146 <i>Myrmecobius fasciatus</i> (Numbat, Walpurti)		T	
512.	24194 <i>Nyctophilus geoffroyi</i> (Lesser Long-eared Bat)			
513.	24085 <i>Oryctolagus cuniculus</i> (Rabbit)	Y		
514.	48070 <i>Phascogale tapoatafa</i> subsp. <i>wambenger</i> (South-western Brush-tailed Phascogale, Wambenger)		T	
515.	24234 <i>Pseudomys delicatulus</i> (Delicate Mouse)			
516.	24173 <i>Pteropus scapulatus</i> (Little Red Flying-fox)			
517.	24243 <i>Rattus fuscipes</i> (Western Bush Rat)			
518.	24245 <i>Rattus rattus</i> (Black Rat)	Y		
519.	24199 <i>Scotorepens balstoni</i> (Inland Broad-nosed Bat)			
520.	24145 <i>Setonix brachyurus</i> (Quokka)		T	
521.	<i>Sminthopsis murina</i>			
522.	24167 <i>Tarsipes rostratus</i> (Honey Possum, Noolbenger)			



Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
523.	25521 <i>Trichosurus vulpecula</i> (Common Brushtail Possum)			
524.	24158 <i>Trichosurus vulpecula</i> subsp. <i>vulpecula</i> (Common Brushtail Possum)			
525.	24069 <i>Tursiops truncatus</i> (Bottlenose Dolphin)			
526.	24206 <i>Vespadelus regulus</i> (Southern Forest Bat)			
527.	24040 <i>Vulpes vulpes</i> (Red Fox)	Y		
<b>Reptile</b>				
528.	25242 <i>Acanthophis antarcticus</i> (Southern Death Adder)		P3	
529.	42368 <i>Acritoscincus trilineatus</i> (Western Three-lined Skink)			
530.	25241 <i>Antaresia stimsoni</i> subsp. <i>stimsoni</i> (Stimson's Python)			
531.	24990 <i>Aprasia pulchella</i> (Granite Worm-lizard)			
532.	24991 <i>Aprasia repens</i> (Sand-plain Worm-lizard)			
533.	42380 <i>Brachyuropis fasciolatus</i> subsp. <i>fasciolatus</i> (Narrow-banded Shovel-nosed Snake)			
534.	42381 <i>Brachyuropis semifasciatus</i> (Southern Shovel-nosed Snake)			
535.	43380 <i>Chelodina colliei</i> (South-western Snake-necked Turtle)			
536.	24980 <i>Christinus marmoratus</i> (Marbled Gecko)			
537.	24918 <i>Crenadactylus ocellatus</i> subsp. <i>ocellatus</i> (Clawless Gecko)			
538.	30893 <i>Cryptoblepharus buchananii</i>			
539.	25020 <i>Cryptoblepharus plagiocephalus</i>			
540.	30899 <i>Ctenophorus adelaidensis</i> (Southern Heath Dragon, Western Heath Dragon)			
541.	24883 <i>Ctenophorus ornatus</i> (Ornate Crevice-Dragon)			
542.	25027 <i>Ctenotus australis</i>			
543.	25035 <i>Ctenotus delli</i> (Dell's skink, Dell's Ctenotus)		P4	
544.	25039 <i>Ctenotus fallens</i>			
545.	25040 <i>Ctenotus gemmula</i> (Jewelled South-west Ctenotus (Swan Coastal Plain pop P3), skink)			
546.	25047 <i>Ctenotus impar</i>			
547.	25049 <i>Ctenotus labillardieri</i>			
548.	41641 <i>Ctenotus ora</i> (Coastal Plains Skink)		P3	
549.	25766 <i>Delma fraseri</i> (Fraser's Legless Lizard)			
550.	24999 <i>Delma grayii</i>			
551.	25296 <i>Demansia psammophis</i> subsp. <i>reticulata</i> (Yellow-faced Whipsnake)			
552.	25325 <i>Dendrelaphis punctulata</i> (Green Tree Snake)			
553.	24929 <i>Diplodactylus granariensis</i> subsp. <i>granariensis</i>			
554.	24939 <i>Diplodactylus polyophthalmus</i>			
555.	24940 <i>Diplodactylus pulcher</i>			
556.	25096 <i>Egernia kingii</i> (King's Skink)			
557.	25100 <i>Egernia napoleonis</i>			
558.	25250 <i>Elapognathus coronatus</i> (Crowned Snake)			
559.	24959 <i>Gehyra variegata</i>			
560.	25232 <i>Hemidactylus frenatus</i> (Asian House Gecko)	Y		
561.	25115 <i>Hemiergis initialis</i> subsp. <i>initialis</i>			
562.	25119 <i>Hemiergis quadrilineata</i>			
563.	24961 <i>Heteronotia binoei</i> (Bynoe's Gecko)			
564.	25131 <i>Lerista distinguenda</i>			
565.	25133 <i>Lerista elegans</i>			
566.	25147 <i>Lerista lineata</i> (Perth Slider, Lined Skink)		P3	
567.	25148 <i>Lerista lineopunctulata</i>			
568.	25165 <i>Lerista praepedita</i>			
569.	25005 <i>Lialis burtonis</i>			
570.	42414 <i>Lucasium alboguttatum</i>			
571.	25184 <i>Menetia greyii</i>			
572.	25240 <i>Morelia spilota</i> subsp. <i>imbricata</i> (Carpet Python)			
573.	25191 <i>Morethia lineocellata</i>			
574.	25192 <i>Morethia obscura</i>			
575.	25248 <i>Neelaps bimaculatus</i> (Black-naped Snake)			
576.	25249 <i>Neelaps calonotos</i> (Black-striped Snake, black-striped burrowing snake)		P3	
577.	25252 <i>Notechis scutatus</i> (Tiger Snake)			
578.	25253 <i>Parasuta gouldii</i>			
579.	25255 <i>Parasuta nigriceps</i>			
580.	25007 <i>Pletholax gracilis</i> subsp. <i>gracilis</i> (Keeled Legless Lizard)			
581.	25510 <i>Pogona minor</i> (Dwarf Bearded Dragon)			
582.	24907 <i>Pogona minor</i> subsp. <i>minor</i> (Dwarf Bearded Dragon)			
583.	25261 <i>Pseudechis australis</i> (Mulga Snake)			
584.	25345 <i>Pseudemydura umbrina</i> (Western Swamp Tortoise, Western Swamp Turtle)		T	
585.	25511 <i>Pseudonaja affinis</i> (Dugite)			
586.	25259 <i>Pseudonaja affinis</i> subsp. <i>affinis</i> (Dugite)			
587.	25264 <i>Pseudonaja nuchalis</i> (Gwardar, Northern Brown Snake)			
588.	25008 <i>Pygopus lepidopodus</i> (Common Scaly Foot)			
589.	25266 <i>Simoselaps bertholdi</i> (Jan's Banded Snake)			
590.	24943 <i>Strophurus spinigerus</i> subsp. <i>inornatus</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
591.	24942 <i>Strophurus spinigerus subsp. spinigerus</i>			
592.	25203 <i>Tiliqua occipitalis (Western Bluetongue)</i>			
593.	25519 <i>Tiliqua rugosa</i>			
594.	25204 <i>Tiliqua rugosa subsp. aspera</i>			
595.	25207 <i>Tiliqua rugosa subsp. rugosa</i>			
596.	24983 <i>Underwoodisaurus milii (Barking Gecko)</i>			
597.	25218 <i>Varanus gouldii (Bungarra or Sand Monitor)</i>			
598.	25225 <i>Varanus rosenbergi (Heath Monitor)</i>			
599.	25526 <i>Varanus tristis (Racehorse Monitor)</i>			

**Conservation Codes**

T - Rare or likely to become extinct  
 X - Presumed extinct  
 IA - Protected under international agreement  
 S - Other specially protected fauna  
 1 - Priority 1  
 2 - Priority 2  
 3 - Priority 3  
 4 - Priority 4  
 5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.



# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 18/04/18 18:43:59

## [Summary](#)

### [Details](#)

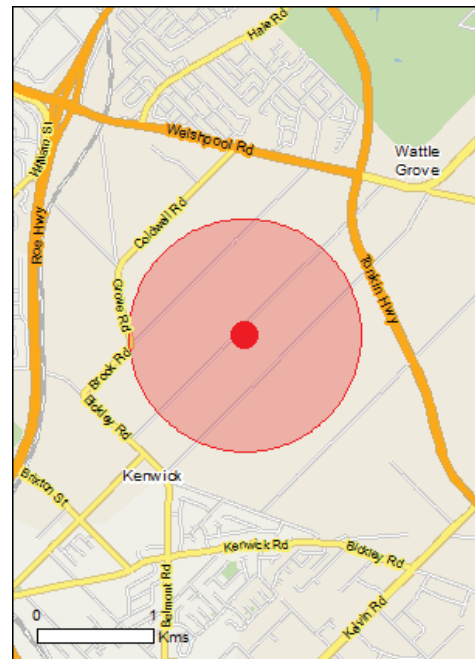
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

### [Caveat](#)

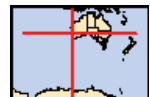
### [Acknowledgements](#)



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[Coordinates](#)

Buffer: 1.0Km



# Summary

## Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Importance:</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Area:</a>	None
<a href="#">Listed Threatened Ecological Communities:</a>	3
<a href="#">Listed Threatened Species:</a>	32
<a href="#">Listed Migratory Species:</a>	9

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

<a href="#">Commonwealth Land:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	15
<a href="#">Whales and Other Cetaceans:</a>	None
<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves Terrestrial:</a>	None
<a href="#">Commonwealth Reserves Marine:</a>	None

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

<a href="#">State and Territory Reserves:</a>	1
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	37
<a href="#">Nationally Important Wetlands:</a>	1
<a href="#">Key Ecological Features (Marine)</a>	None

# Details

## Matters of National Environmental Significance

### Listed Threatened Ecological Communities [\[ Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
<a href="#">Banksia Woodlands of the Swan Coastal Plain ecological community</a>	Endangered	Community likely to occur within area
<a href="#">Clay Pans of the Swan Coastal Plain</a>	Critically Endangered	Community likely to occur within area
<a href="#">Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain</a>	Endangered	Community known to occur within area

### Listed Threatened Species [\[ Resource Information \]](#)

Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Botaurus poiciloptilus</a> Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calyptorhynchus banksii naso</a> Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Calyptorhynchus baudinii</a> Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Roosting known to occur within area
<a href="#">Calyptorhynchus latirostris</a> Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Rostratula australis</a> Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
<b>Mammals</b>		
<a href="#">Dasyurus geoffroii</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Pseudocheirus occidentalis</a> Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence area
<a href="#">Setonix brachyurus</a> Quokka [229]	Vulnerable	Species or species habitat may occur within area
<b>Plants</b>		
<a href="#">Acacia anomala</a> Grass Wattle, Chittering Grass Wattle [8153]	Vulnerable	Species or species habitat may occur within area
<a href="#">Andersonia gracilis</a> Slender Andersonia [14470]	Endangered	Species or species habitat known to occur within area
<a href="#">Austrostipa bronwenae</a> [87808]	Endangered	Species or species habitat known to occur within area
<a href="#">Banksia mimica</a> Summer Honeypot [82765]	Endangered	Species or species habitat likely to occur within area
<a href="#">Calytrix breviseta subsp. breviseta</a> Swamp Starflower [23879]	Endangered	Species or species habitat known to occur within area
<a href="#">Chamelaucium sp. Gingin (N.G.Marchant 6)</a> Gingin Wax [88881]	Endangered	Species or species habitat may occur within area
<a href="#">Conospermum undulatum</a> Wavy-leaved Smokebush [24435]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Diplolaena andrewsii</a> [6601]	Endangered	Species or species habitat may occur within area
<a href="#">Diuris micrantha</a> Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
<a href="#">Diuris purdiei</a> Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area
<a href="#">Drakaea elastica</a> Glossy-leaved Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
<a href="#">Eleocharis keigheryi</a> Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Eremophila glabra subsp. chlorella</a> [84927]	Endangered	Species or species habitat known to occur within area
<a href="#">Eucalyptus x balanites</a> Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area
<a href="#">Grevillea curviloba subsp. incurva</a> Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
<a href="#">Grevillea thelemanniana</a> Spider Net Grevillea [32835]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Lepidosperma rostratum</a> Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
<a href="#">Ptilotus pyramidatus</a> Pyramid Mulla-mulla [18216]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Synaphea sp. Fairbridge Farm (D. Papenfus 696)</a> Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area
<a href="#">Thelymitra dedmaniarum</a> Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat may occur within area
<a href="#">Thelymitra stellata</a> Star Sun-orchid [7060]	Endangered	Species or species habitat likely to occur within area

#### Listed Migratory Species [ Resource Information ]

\* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

## Other Matters Protected by the EPBC Act

Listed Marine Species		[ Resource Information ]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
<b>Birds</b>		
<a href="#">Actitis hypoleucos</a> Common Sandpiper [59309]		Species or species habitat may occur within area
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat likely to occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat known to occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Calidris acuminata</a> Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
<a href="#">Calidris ferruginea</a> Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Calidris melanotos</a> Pectoral Sandpiper [858]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<a href="#">Motacilla cinerea</a> Grey Wagtail [642]		Species or species habitat may occur within area
<a href="#">Numenius madagascariensis</a> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
<a href="#">Pandion haliaetus</a> Osprey [952]		Species or species habitat may occur within area
<a href="#">Rostratula benghalensis (sensu lato)</a> Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
<a href="#">Thinornis rubricollis</a> Hooded Plover [59510]		Species or species habitat may occur within area
<a href="#">Tringa nebularia</a> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area



## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

Name	State
Kenwick Wetlands	WA

### Invasive Species [\[ Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
<b>Birds</b>		

Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
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Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
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Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
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Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
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Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
--	--	--

Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
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Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
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Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
--	--	--

Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
---	--	--

Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur
---	--	--

Name	Status	Type of Presence within area
<b>Mammals</b>		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
<b>Plants</b>		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species

Name	Status	Type of Presence
Lantana camara		habitat may occur within area
Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum		
African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea		
Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata		
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate		
Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla		
Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area

#### Reptiles

Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

#### Nationally Important Wetlands

[ Resource Information ]

Name	State
<a href="#">Brixton Street Swamps</a>	WA

# Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

## Coordinates

-32.01868 115.98827

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

# **APPENDIX D**

## **HABITAT TREE DETAILS**



Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Occupancy	Chew Marks	Potential Nest Hollow	Comments
62 360	50H	403734	6457262	Marri		0									No	
63 360	50H	404565	6456191	Marri		0									No	
64 360	50H	404579	6456184	Jarrah		0									No	
65 360	50H	404633	6455991	Marri		0									No	
66 360	50H	403661	6457444	Marri		0									No	
67 360	50H	403702	6457408	Marri		0									No	
68 360	50H	403683	6457449	Marri		0									No	
69 360	50H	403697	6457410	Marri		0									No	
70 360	50H	403683	6457381	Marri		0									No	
71 360	50H	403651	6457448	Marri		0									No	
72 360	50H	403684	6457371	Marri		0									No	
73 360	50H	403689	6457438	Marri		0									No	
74 360	50H	403673	6457430	Marri		0									No	
75 360	50H	403650	6457442	Marri		0									No	
76 360	50H	403610	6457443	Marri		0									No	
77 360	50H	403640	6457437	Marri		0									No	
78 360	50H	403682	6457433	Marri		0									No	
79 360	50H	403676	6457390	Marri		0									No	
80 360	50H	403626	6457405	Marri		0									No	
81 360	50H	403673	6457400	Marri		0									No	
82 360	50H	403622	6457404	Marri		0									No	
83 360	50H	403642	6457386	Marri		0									No	
84 360	50H	403618	6457411	Marri		0									No	
85 360	50H	403641	6457409	Marri		0									No	
103 360	50H	403579	6457273	Marri		0									No	
104 360	50H	403583	6457271	Marri		0									No	
105 360	50H	403586	6457272	Marri		0									No	
106 360	50H	403578	6457271	Marri		0									No	Used for Roosting
107 360	50H	403579	6457281	Marri		0									No	
108 360	50H	403689	6457229	Marri		0									No	
109 360	50H	403583	6457268	Marri		0									No	
110 360	50H	403562	6457262	Marri		0									No	
133 360	50H	404127	6457852	Flooded Gum		0									No	
134 360	50H	404678	6456538	Marri		0									No	
135 360	50H	404646	6456576	Marri		0									No	
136 360	50H	403623	6457420	Marri		0									No	
137 360	50H	404594	6455783	Jarrah		0									No	
151 360	50H	403672	6457396	Marri		0									No	Used for Roosting
152 360	50H	403544	6457254	Marri		0									No	Used for Roosting



# **APPENDIX E**

## **CAMERA TRAP RESULTS**

Camera Trap Results

Camera Number	Date	Common Name	Species	Number
GH 11	02/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 11	05/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 11	06/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	2
GH 11	08/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 11	09/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 11	10/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	2
GH 16	02/11/2017	Australian Magpie	<i>Cracticus tibicen</i>	1
GH 16	03/11/2017	Bobtail	<i>Tiliqua rugosa</i>	1
GH 16	11/11/2017	Cat	<i>Felis catus</i>	1
GH 16	13/11/2017	Cat	<i>Felis catus</i>	1
GH 16	28/10/2017	Cat	<i>Felis catus</i>	1
GH 16	30/10/2017	Cat	<i>Felis catus</i>	1
GH 16	08/11/2017	Common Bronzewing	<i>Phaps chalcoptera</i>	1
GH 16	24/10/2017	Painted Button-quail	<i>Turnix varia</i>	1
GH 16	02/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 16	27/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 16	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 16	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 16	03/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	03/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	09/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	13/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	24/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	25/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	26/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	29/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 16	02/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	03/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	04/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	05/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	07/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	08/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	09/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	10/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	11/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	12/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	13/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	23/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	25/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	26/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	27/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	29/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	30/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 16	31/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 18	26/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 18	27/10/2017	Quenda	<i>Isoodon fusciventer</i>	1

Camera Number	Date	Common Name	Species	Number
GH 18	23/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 18	05/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 18	06/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 18	07/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 18	11/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 22	02/11/2017	Cat	<i>Felis catus</i>	1
GH 22	13/11/2017	Cat	<i>Felis catus</i>	1
GH 22	08/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 22	24/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 22	27/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 22	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 22	31/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 22	01/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	03/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	04/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	06/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	07/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	08/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	09/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	10/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	2
GH 22	12/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	13/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	24/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	25/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	26/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	27/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	28/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	29/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	30/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	31/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 22	29/10/2017	Splendid Fairy-wren	<i>Malurus splendens</i>	1
GH 33	06/11/2017	Bobtail	<i>Tiliqua rugosa</i>	1
GH 33	13/11/2017	House Mouse	<i>Mus musculus</i>	1
GH 33	03/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 33	11/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	12/11/2017	Cat	<i>Felis catus</i>	1
GH 38	28/10/2017	Cat	<i>Felis catus</i>	1
GH 38	01/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	03/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	2
GH 38	04/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	10/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	11/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	12/11/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	23/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	23/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	25/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	27/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	28/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1

Camera Number	Date	Common Name	Species	Number
GH 38	30/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	31/10/2017	Rabbit	<i>Oryctolagus cuniculus</i>	1
GH 38	01/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 38	02/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 38	10/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 39	02/11/2017	Buff-banded Rail	<i>Gallirallus philippensis</i>	1
GH 39	28/10/2017	Buff-banded Rail	<i>Gallirallus philippensis</i>	1
GH 39	03/11/2017	Cat	<i>Felis catus</i>	1
GH 39	23/10/2017	Cat	<i>Felis catus</i>	1
GH 39	26/10/2017	Cat	<i>Felis catus</i>	1
GH 39	27/10/2017	Cat	<i>Felis catus</i>	1
GH 39	29/10/2017	Cat	<i>Felis catus</i>	1
GH 39	02/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 39	23/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 39	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 39	31/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 40	25/10/2017	Cat	<i>Felis catus</i>	1
GH 40	29/10/2017	Cat	<i>Felis catus</i>	1
GH 40	11/11/2017	Common Bronzewing	<i>Phaps chalcoptera</i>	2
GH 40	31/10/2017	Pacific Black Duck	<i>Anas superciliosa</i>	3
GH 40	27/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 40	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 40	01/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	03/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	04/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	05/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	06/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	12/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	29/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	30/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 40	31/10/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 44	25/10/2017	Cat	<i>Felis catus</i>	1
GH 44	11/11/2017	Gould's Sand Monitor	<i>Varanus gouldii</i>	1
GH 44	04/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	07/11/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	23/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	27/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	28/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	29/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	30/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	31/10/2017	Quenda	<i>Isoodon fusciventer</i>	1
GH 44	01/11/2017	Red Fox	<i>Vulpes vulpes</i>	2
GH 44	03/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 44	05/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 44	14/11/2017	Red Fox	<i>Vulpes vulpes</i>	1
GH 44	30/10/2017	Red Fox	<i>Vulpes vulpes</i>	1

# **APPENDIX F**

## **SIGNIFICANT SPECIES PROFILES**

### **Unnamed Cricket *Kawaniphila pachomai***

Status and Distribution: Listed as Priority 1 by DBCA. Full distribution is not known. The NatureMap database lists only two records, one near Witchcliffe and one north of Armadale near Perth (DBCA 2018b).

Habitat: The species apparently occurs in moist, shaded uncleared forests and gullies in the south-west, mostly the Tingle forests along the South Coast (DBCA 2018b).

Likely presence in subject site: It is very unlikely that this species of cricket utilises the subject site due to its overall degraded nature and lack of favoured habitat.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Unnamed Bee *Glossurocolletes bilobatus***

Status and Distribution: Listed as Priority 2 by DBCA. This species of native bee has been collected only from the Stirling Ranges, near Yanchep and from Greater Brixton Street Wetlands (DBCA 2018b).

Habitat: Life history and habits are poorly documented/unknown. It has been recorded only on the flowers of *Gompholobium aristatum* on which it may be dependent. Possible threats include clearing for housing and altered fire regimes (DBCA 2018b).

Likely presence in subject site: It is very unlikely that this species of bee utilises the subject site due to its overall degraded nature and lack of favoured plant species. May however occur within the Greater Brixton Street Wetlands (NatureMap record from 1981) though its current status in this area is unknown.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Unnamed Bee *Leioproctus douglasiellus***

Status and Distribution: Listed as Scheduled 2 under the *WC Act* and as Critically Endangered under the *EPBC Act*. It is known only from specimens collected at Pearce, Forrestdale Lake and Greater Brixton Street Wetlands.

Habitat: This species of native bee appears to be dependent on the flowers of plants of the genus *Goodenia* (e.g. *G. filiformis* and *G. pulchella*).

Likely presence in subject site: Most of the subject site has been cleared of native understory and therefore represents unsuitable as habitat for this species. Those areas with vegetation are degraded and do not contain the necessary plant species for a population of this species to persist. May however occur within the Greater Brixton Street Wetlands (NatureMap record from 2006) though its current status in this area is unknown.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Short-tongued Bee *Neopasiphae simplicior***

Status and Distribution: Listed as Scheduled 2 under the *WC Act* and as Critically Endangered under the *EPBC Act*. It is currently only known from bushland adjacent to Forrestdale Lake and Armadale Golf Course, although the holotype was collected from Cannington in 1954 (DBCA 2018b).

Habitat: This species of native bee has been collected on flowers of *Goodenia filiformis*, *Lobelia tenulor*, *Angianthus preissianus* and *Velleia* sp.

Likely presence in subject site: Most of the subject site has been cleared of native understory and therefore represents unsuitable as habitat for this species. Those areas with vegetation are degraded and do not contain the necessary plant species for a population of this species to persist.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Carter's Freshwater Mussel *Westralunio carteri***

Status and Distribution: Listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Carter's freshwater mussel is the only freshwater mussel species endemic to south-western WA, ranging from the Moore River south to the Frankland River (Morgan *et al.* 2011).

Habitat: Occurs in greatest abundance in slower flowing streams with stable sediments that are soft enough for burrowing amongst woody debris and exposed tree roots. Salinity tolerance quite low (Morgan *et al.* 2011).

Likely presence in subject site: There are some records of this species from Yule Brook downstream of the subject site (DBCA 2018b) however the section of the brook within

the subject site looks unsuitable for the species to persist (too degraded, low water flows in summer).

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

#### **Perth Lined Lerista *Lerista lineata***

Status and Distribution: Listed as Priority 3 by DBCA. Found in the lower west coast from Perth south to Leschenault Peninsula/Kemerton. It has also been found at Rottnest Island and Garden Island (Storr *et al.* 1999) and in some suburban areas of Perth (Bush *et al.* 2002).

Habitat: This small species of skink inhabits white sands (Storr *et al.* 1999) under areas of shrubs and heath where it inhabits loose soil and leaf litter (Nevill 2005) particularly in association with banksias (Bush *et al.* 2007).

Likely presence in subject site: The subject site is outside of this species current documented range and habitat appears too degraded.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat is considered likely.

#### **Darling Range Heath *Ctenotus delli***

Status and Distribution: Listed as Priority 4 by DBCA. Main distribution is in the Darling Range from the Darlington/Mundaring area to near Collie (Storr *et al.* 1999).

Habitat: Humid zone, mainly laterite and clays (Storr *et al.* 1999) supporting jarrah/marri woodland with a shrub dominated understorey, sheltering in dense vegetation, inside grass trees and beneath rocks, sometimes in burrows (Nevill 2005). Occasionally found on granite outcrops (Bush *et al.* 2010).

Likely presence in subject site: The subject site is outside of this species current documented range and it contains no suitable habitat for this species to utilise.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.



### **Coastal Plains Skink *Ctenotus ora***

Status and Distribution: Listed as Priority 3 by DBCA. *Ctenotus ora* is a recently described species of medium sized skink with a restricted range in the south-west of Western Australia, most of which has been cleared for agriculture and urban development. It cannot reliably be distinguished from the more widespread *C. labillardieri* except by DNA sequences, but the two species appear to have disjunct distributions. Based on only five specimens reliably identified as *Ctenotus ora*, the species is apparently restricted to the southern Swan Coastal Plain and Cape Naturaliste area, as far north as Pinjarra and south as far as Yallingup (Kay & Keogh 2012).

Habitat: Sandy substrates with low vegetation (including heath) in open *Eucalyptus/Corymbia* woodland over *Banksia* (Kay & Keogh 2012). Individuals have been found sheltering under *Banksia* logs on white sand, and trapped in eucalypt woodland with *Banksia* or peppermint mid-storey, or heath (Bamford *et al.* 2010). Open eucalypt woodland over *Banksia* and low vegetation on sandy coastal plain and coastal dunes (Wilson and Swan 2017).

Likely presence in subject site: The subject site is outside of this species current documented range and habitat appears too degraded.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Black-striped Snake *Neelaps calonotos***

Status and Distribution: Listed as Priority 3 by DBCA. Found in the lower west coast from Lancelin to Mandurah. It is locally abundant but is under threat due to land clearing (Storr *et al.* 1999).

Habitat: This species of snake favours sandy soils supporting heath and banksia/eucalypt woodland (Nevill 2005).

Likely presence in subject site: Most of the subject site has been cleared of native understory and therefore represents unsuitable as habitat for this species. Those areas with vegetation are degraded fragmented and are unlikely to support a population or individuals of this species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Southern Death Adder *Acanthophis antarcticus***

Status and Distribution: The southern death adder is classified as Priority 3 by DBCA. Now locally confined to the Darling Range between Mt Helena and Jarrahdale (Bush *et al.* 2002).

Habitat: In the Darling Range this species is typically found within Jarrah woodlands adjacent to granite outcrops and along densely vegetated creeks (Bush *et al.* 1995).

Likely presence in subject site: The subject site is outside of this species current documented range and it contains no suitable habitat for this species to utilise.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Malleefowl *Leipoa ocellata***

Status and Distribution: This species is listed as Schedule 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Originally common, but now generally rare to uncommon and patchily distributed.

Current distribution mainly southern arid and semi-arid zones, north to Shark Bay, Jingemarra, Colga Downs and Yeelirrie, east to Earnest Giles Range, Yeo Lake, lower Ponton Creek and to Eucla and west and south to Cockleshell Gully, the Wongan Hills, Stirling Range, Beaufort Inlet, Hatters Hill, Mt Ragged and Point Malcolm (Johnstone and Storr 1998).

Habitat: Mainly scrubs and thickets of mallee *Eucalyptus* spp., boree *Melaleuca lanceolata* and bowgada *Acacia linophylla*, also dense litter forming shrublands.

Likely presence in subject site: This species is regionally extinct and would never, under normal circumstances occur anywhere on the Swan Coastal Plain.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species will occur as it is unlikely to be present.

### **Australasian Bittern *Botaurus poiciloptilus***

Status and Distribution: Classified as Schedule 2 under the *WC Act* and as Endangered under the *EPBC Act*. The species is uncommon to rare (Morcombe 2004), but locally common in wetter parts of south west (Johnstone and Storr 1998). Occurs north to Moora and east to Mt Arid (Johnstone and Storr 1998).

Habitat: Freshwater wetlands, occasionally estuarine; prefers heavy vegetation (Morcombe 2004) such as beds of tall dense *Typha*, *Baumea* and sedges in freshwater swamps (Johnstone and Storr 1998).

Likely presence in subject site: The subject site contains no suitable habitat for this species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Glossy Ibis *Plegadis falcinellus***

Status and Distribution: This species is listed as Schedule 5 under the *WC Act* and as migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. The glossy ibis frequents swamps and lakes throughout much of the Australian mainland but is most numerous in the north. It is a non-breeding visitor to Tasmania and the south-west of Western Australia. The Glossy ibis is both migratory and nomadic. Its range expands inland after good rains, but its main breeding areas seem to be in the Murray-Darling Basin of New South Wales and Victoria, the Macquarie Marshes in New South Wales, and in southern Queensland. Glossy ibis often move north in autumn, then return south to their main breeding areas in spring and summer (Pizzey & Knight 2012).

Habitat: Well vegetated wetlands, wet pastures, rice fields, floodwaters, floodplains, brackish or occasionally saline wetlands, mangroves, mudflats, occasionally dry grasslands (Pizzey & Knight 2012).

Likely presence in subject site: May occur very occasionally at some manmade wetlands/dams but the subject site contains only marginal habitat for this species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Painted Snipe *Rostratula benghalensis***

Status and Distribution: This species is listed as Schedule 2 under the *WC Act* and as Endangered and Migratory under the *EPBC Act*. Sparsely distributed in better watered regions: Kimberley, North West and South Western divisions. Also eastern Australia and Tasmanian (Johnstone and Storr 1998).

Habitat: Well vegetated shallows and margins of wetlands, dams, sewerage ponds, wet pastures, marshy areas, irrigation systems, lignum, tea tree scrub, open timber. Requires dense low cover (Morcombe 2004).

Likely presence in subject site: The subject site contains no suitable habitat for this species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Other Migratory Shorebirds/Wetland Species**

A number of migratory shorebirds/wetland species are listed as potentially occurring in the general area. Specific species are not discussed.

Status and Distribution: Migratory shorebirds are listed under the Schedule 5 of the *WC Act*, the *EPBC Act 1999* and under international agreements to which Australia is a signatory. All species are either widespread summer migrants to Australia or residents. State and Federal threatened species status varies between species.

Habitat: Varies between species but includes beaches and permanent/temporary wetlands varying from billabongs, swamps, lakes, floodplains, sewerage farms, saltwork ponds, estuaries, lagoons, mudflats sandbars, pastures, airfields, sports fields and lawns.

Likely presence in subject site: Some more common species may occur very occasionally at some manmade wetlands/dams but the subject site contains only very marginal habitat for these species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Blue-billed Duck *Oxyura australis***

Status and Distribution: Recently listed as Priority 4 by DBCA (DBCA 2018b). Rare to moderately common (most plentiful on the Swan Coastal Plain and in the Great Southern). South-western: north to Lake Pinjarrega and east to Esperance; vagrant further north and east (as far as Thundelarra and Kalgoorlie). Also south-eastern Australian and Tasmania (Johnstone and Storr 1998).

**Habitat:** Well vegetated freshwater swamps, large dams and lakes, winters on more open water (Morcombe 2004). Occasionally salt lakes and estuaries freshened by floodwaters (Johnstone and Storr 1998).

**Likely presence in subject site:** May occur very occasionally at some manmade wetlands/dams but the subject site contains only marginal habitat for this species.

Not considered a potential species based on currently available information.

**Potential impact of development:** No impact on this species or its preferred habitat will occur.

### **Osprey *Pandion haliaetus***

**Status and Distribution:** This species is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. Moderately common to very common in sheltered seas around the north and west coast islands south to 31°S; uncommon to common on mainland coasts, estuaries and large rivers north of tropic, rare to uncommon elsewhere (Johnstone and Storr 1998).

**Habitat:** Coasts, estuaries, bays, inlets, islands, and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Ascends larger rivers (Pizzey & Knight 2012). Construct nests on prominent headland, large trees, communication towers (Simpson & Day 2010).

**Likely presence in subject site:** The subject site contains no suitable habitat for these species.

Not considered a potential species based on currently available information.

**Potential impact of development:** No impact on this species or its preferred habitat will occur.

### **Peregrine Falcon *Falco peregrinus***

**Status and Distribution:** This species is listed as Schedule 7 under the *WC Act*. Individuals of this species are uncommon/rare but wide ranging across Australia. Moderately common at higher levels of the Stirling Range, uncommon in hilly, north west Kimberley, Hamersley and Darling Ranges; rare or scarce elsewhere (Johnstone and Storr 1998).

**Habitat:** Diverse from rainforest to arid shrublands, from coastal heath to alpine (Morcombe 2004). Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes (Johnstone and Storr 1998). The species utilises the

ledges, cliff faces and large hollows/broken spouts of trees for nesting. It will also occasionally use the abandoned nests of other birds of prey.

Likely presence in subject site: This species potentially utilises some sections of the subject site as part of a much larger home range. No evidence of nesting was observed and the probability of this species breeding within the subject site can be considered to be very low.

Listed as a potential species based on available information.

Potential impact of development: Loss or modification of some habitat. However, no significant impact on this species is considered likely.

### **Fork-tailed Swift *Apus pacificus***

Status and Distribution: The fork-tailed swift is listed as Schedule 5 under the *WC Act* and as Migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. This species breeds in Siberia and the Himalayas and migrates to Australia in October, returning to the breeding grounds by May or June (Morcombe 2003).

Habitat: Low to very high airspace over varied habitat from rainforest to semi desert (Morcombe 2004).

Likely presence in subject site: It is potentially an occasional summer visitor to the subject site but is entirely aerial and largely independent of terrestrial habitats. Frequency of occurrence would be very low and then only for very brief periods of time.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Grey Wagtail *Motacilla cinerea***

Status and Distribution: The grey wagtail is listed as Schedule 3 under the *WC Act* and as Migratory under the *EPBC Act* including international agreements to which Australia is a signatory. A rarely recorded, accidental vagrant that has on a few occasions been recorded on widely separated parts of the Australian coastline (Pizzey & Knight 2012).

Habitat: In Australia, near running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields (Pizzey & Knight 2012).

Likely presence in subject site: Cleared paddock areas may represent suitable habitat for this species but as it is an “accidental vagrant” the likelihood of occurrence is extremely low. This species would only occur very rarely, if ever and then only for brief periods.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species will occur.

### **Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso***

Status and Distribution: Listed as Scheduled 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Found in the humid and subhumid south west, mainly hilly interior, north to Gingin and east to Mt Helena, Christmas Tree Well, North Bannister, Mt Saddleback, Rock Gully and the upper King River (Johnstone and Storr 1998).

Habitat: Eucalypt forests, feeds on marri, jarrah, blackbutt, karri, sheoak and snottygobble. The forest red-tailed black cockatoo nests in the large hollows of Marri, Jarrah and Karri (Johnstone and Kirkby 1999). In Marri, the nest hollows of the forest red-tailed black cockatoo range from 8-14m above ground, the entrance is 12 – 41cm in diameter and the depth is one to five metres (Johnstone and Storr 1998).

Breeding commences in winter/spring. There are few records of breeding in the forest red-tailed black cockatoo (Johnstone and Storr 1998), but eggs are laid in October and November (Johnstone 1997; Johnstone and Storr 1998). Recent data however indicates that breeding in all months of the year occurs with peaks in spring and autumn–winter (Ron Johnstone pers comms). Incubation period 29 – 31 days. Young fledge at 8 to 9 weeks (Simpson and Day 2010).

Likely presence in subject site: Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species is known to roost within the subject site.

Listed as a potential species based on available information.

Potential impact of development: Potential for the loss of small areas of habitat.

### **Carnaby’s Black-Cockatoo *Calyptorhynchus latirostris***

Status and Distribution: Carnaby’s black cockatoo is listed as Scheduled 2 under the *WC Act* and as Endangered under the *EPBC Act*. Confined to the south-west of Western Australia, north to the lower Murchison River and east to Nabawa, Wilroy,

Waddi Forest, Nugadong, Manmanning, Durokoppin, Noongar (Moorine Rock), Lake Cronin, Ravensthorpe Range, head of Oldfield River, 20 km ESE of Condingup and Cape Arid; also casual on Rottneest Island (Johnstone and Storr 1998).

Habitat: Forests, woodlands, heathlands, farms; feeds on banksia, hakeas and marri. Carnaby's black cockatoo has specific nesting site requirements. Nests are mostly in smoothed-barked eucalypts with the nest hollows ranging from 2.5 to 12m above the ground, an entrance from 23-30cm diameter and a depth of 0.1-2.5m (Johnstone and Storr, 1998).

Breeding occurs in winter/spring mainly in eastern forest and wheatbelt where they can find mature hollow bearing trees to nest in (Morcombe 2004). Judging from breeding records in the Storr – Johnstone Bird Data Bank, this species is currently expanding its breeding range westward and south into the Jarrah – Marri forests of the Darling Scarp and into the tuart forests of the swan coastal plain including Yanchep, Lake Clifton and near Bunbury and possibly also in the Lancelin region. Carnaby's Black Cockatoo have also been known to breed close to the town of Mandurah, as well as at Dawesville, Lake Clifton and Baldivis (pers. comm., Ron Johnstone, WA Museum) and there are small resident populations on the southern Swan Coastal Plain near Mandurah, Lake Clifton and near Bunbury. At each of these sites the birds forage in remnant vegetation and adjacent pine plantations (Johnstone 2008).

Carnaby's Black-Cockatoo lays eggs from July or August to October or November, with most clutches being laid in August and September (Saunders 1986). Most of the breeding is in September through to December (Ron Johnstone pers comms). Birds in inland regions may begin laying up to three weeks earlier than those in coastal areas (Saunders 1977). The female incubates the eggs over a period of 28-29 days. The young depart the nest 10–12 weeks after hatching (Saunders 1977; Smith & Saunders 1986).

Likely presence in subject site: Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species may roost within the subject site.

Listed as a potential species based on available information.

Potential impact of development: Potential for the loss of small areas of habitat.



### **Baudin's Black-Cockatoo *Calyptorhynchus baudinii***

Status and Distribution: Listed as Scheduled 3 under the *WC Act* and as Endangered under the *EPBC Act*. Confined to the south-west of Western Australia, north to Gidgegannup, east to Mt Helena, Wandering, Quindanning, Kojonup, Frankland and King River and west to the eastern strip of the Swan Coastal Plain including West Midland, Byford, Nth Dandalup, Yarloop, Wokalup and Bunbury (Johnstone and Storr 1998). On the southern Swan Coastal Plain this cockatoo is in some areas resident but mainly a migrant moving from the deep south-west to the central and northern Darling Range. Between March and September most flocks move north and are concentrated in the northern parts of the Darling Range. During this period birds forage well out onto the southern Swan Coastal Plain to areas such as Harvey, Myalup, Bunbury, Capel, Dunsborough and Meelup. While generally more common in the Darling Range this species can also be common on parts of the southern Swan Coastal Plain especially in mid-August – September when flocks begin to return to their breeding quarters (Johnstone 2008).

Habitat: Mainly eucalypt forests where it feeds primarily on the Marri seeds, (Morcombe, 2004), *Banksia*, *Hakeas* and *Erodium* sp. Also strips bark from trees in search of beetle larvae (Johnstone and Storr 1998). This species of cockatoo nests in large tree hollows, 30–40 cm in diameter and more than 30 cm deep (Saunders 1974).

Baudin's Black-Cockatoo breeds in late winter and spring, from August to November or December (Gould 1972; Johnstone 1997; Saunders 1974; Saunders *et al.* 1985). Eggs laid in October (Johnstone and Storr 1998). Based on observations at currently known nest sites breeding mainly occurs within the October-December period (Ron Johnstone pers comms). Incubation is 28 – 30 days. Young fledge at 8 to 9 weeks (Simpson and Day 2010).

Likely presence in subject site: Some foraging evidence attributed to this species was found during field survey (chewed marri fruits). The small areas of remnant native vegetation containing marri (in addition to some scattered individual trees) within the subject site represents foraging habitat for this species. No actual nest sites were found however larger native endemic trees (>50cm DBH) can be considered potential breeding habitat. This species may roost within the subject site.

Listed as a potential species based on available information.

Potential impact of development: Potential for the loss of small areas of habitat.

### **Chuditch *Dasyurus geoffroi***

Status and Distribution: Listed as Scheduled 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Formerly occurred over nearly 70 per cent of Australia. The

Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of southwest Western Australia. Also occurs in very low numbers in the Midwest, Wheatbelt and South Coast Regions with records from Moora to the north, Yellowdine to the east and south to Hopetoun.

Habitat: Chuditch are known to have occupied a wide range of habitats from woodlands, dry sclerophyll (leafy) forests, riparian vegetation, beaches and deserts. Riparian vegetation appears to support higher densities of Chuditch, possibly because food supply is better or more reliable and better cover is offered by dense vegetation. Chuditch appear to utilise native vegetation along road sides in the wheatbelt (CALM 1994). The estimated home range of a male Chuditch is over 15 km<sup>2</sup> whilst that for females is 3-4 km<sup>2</sup> (Sorena and Soderquist 1995).

Likely presence in subject site: This species requires relatively large continuous areas of vegetation to persist and as a consequence it is rarely recorded on any section of the coastal plain given the extent of clearing and fragmentation that has occurred. Occasional records in the Perth area are transient individuals that have originated from the Darling Range where it is known to persist.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **South-western Brush-tailed Phascogale *Phascogale tapoatafa wambenger***

Status and Distribution: Listed as Scheduled 6 under the *WC Act (1950)*. Present distribution is believed to have been reduced to approximately 50 per cent of its former range. Now known from Perth and south to Albany, west of Albany Highway. Occurs at low densities in the northern Jarrah forest. Highest densities occur in the Perup/Kingston area, Collie River valley, and near Margaret River and Busselton (DEC information pamphlet). Records are less common from wetter forests.

Habitat: This subspecies has been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. A nocturnal carnivore relying on tree hollows as nest sites. The home range for a female Brush-tailed Phascogale is estimated at between 20 and 70 ha, whilst that for males is given as twice that of females. In addition, they tend to utilise a large number (approximately 20) of different nest sites throughout their range (Soderquist, 1995).

Likely presence in subject site: Current status in the wider area uncertain but fragmented nature of the vegetation remnants and limited number of hollow trees would suggest it is unlikely to occur.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat is anticipated.

### **Numbat *Myrmecobius fasciatus***

Status and Distribution: Listed as Scheduled 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Once occurred across much of arid and semi arid southern Australia, now restricted to a few remnant forests of Wandoo, Powderbark Wandoo or jarrah in South west WA (Menkhorst & Knight 2011). Rare, scattered. Found only at Dryandra, Perup and six other translocation sites (van Dyck & Strahan 2008).

Habitat: Generally dominated by eucalypts that provide hollow logs and branches for shelter and termites for food (van Dyck & Strahan 2008).

Likely presence in subject site: This species is locally extinct.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Quenda *Isodon fusciventer***

Status and Distribution: Listed as Priority 4 by DBCA. Widely distributed in the south west from near Cervantes north of Perth to east of Esperance, patchy distribution through the Jarrah and Karri forest and on the Swan Coastal Plain, and inland as far as Hyden. Has been translocated to Julimar State Forest, Hills Forest Mundaring, Tutanning Nature Reserve, Boyagin Nature Reserve, Dongolocking Nature Reserve, Leschenault Conservation Park, and Karakamia and Paruna Sanctuaries (DBCA information pamphlet) and Nambung National Park (DBCA pers. coms.)

Habitat: Dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover. Populations inhabiting Jarrah and Wandoo forests are usually associated with watercourses. Quendas can thrive in more open habitat subject to exotic predator control (DBCA information pamphlet).

Likely presence in subject site: This species was recorded at several locations on camera traps within Bush Forever Site 387 during the survey period. It has also previously been recorded along Yule Brook and in highly degraded sections of Precinct 3A which contained dense grass (Harewood 2015). It is therefore likely to persist in some paddocks with dense grasses and bush remnants with dense groundcover. Most of the subject site is however unsuitable for this species to use as habitat.

Listed as a potential species based on available information.

Potential impact of development: Potential for the loss of small areas of marginal natural and degraded habitat.

### **Western Ringtail Possum *Pseudocheirus occidentalis***

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act*. Common in suitable habitat (de Tores 2008). The highest densities of this species are recorded in Peppermint habitat near Busselton area; relatively high densities are found in Jarrah/Marri forest at Perup (de Tores 2008).

The Western Ringtail Possum has a restricted distribution in south-western Western Australia. Most known populations (natural and translocated) are now restricted to near coastal areas of the south west from the Dawesville area to the Waychinicup National Park. Inland, it is also known to be relatively common in a small part of the lower Collie River valley, the Perup Nature Reserve and surrounding forest blocks near Manjimup.

Habitat: The western ringtail possum was once located in a variety of habitats including Coastal Peppermint, Coastal Peppermint-Tuart, Jarrah-Marri associations, Sheoak woodland, and eucalypt woodland and mallee. Coastal populations mostly inhabit Peppermint-Tuart associations with highest densities in habitats with dense, relatively lush vegetation. Inland, the largest known populations occur in the Upper Warren area east of Manjimup (Wayne *et al* 2005). In this area the peppermint tree is naturally absent and jarrah-marri associations constitute the species refuge and foraging habitat. In areas where Peppermint is absent or rare WRPs have been observed feeding predominately on young Jarrah, *Nuytsia floribunda* and *Allocasuarina fraseriana* (G Harewood pers. obs.).

Likely presence in subject site: This species is locally extinct.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Quokka *Setonix brachyurus***

Status and Distribution: Listed as Scheduled 3 under the *WC Act* and as Vulnerable under the *EPBC Act*. Rare and restricted in south west W.A. from south of Perth to Two Peoples Bay. The distribution of the Quokka includes Rottnest and Bald Islands, and at least 25 known sites on the mainland, including Two Peoples Bay Nature Reserve, Torndirrup National Park, Mt Manypeaks National Park, Walpole-Nornalup National Park, and various swamp areas through the south-west forests from Jarrahdale to Walpole.

Habitat: Mainland populations of this species are currently restricted to densely vegetated coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems where they are less vulnerable to predation. The species is nocturnal.

Likely presence in subject site: This species is locally extinct and there is also an absence of suitable habitat.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Woylie *Bettongia Penicillata ogibyi***

Status and Distribution: Listed as Schedule 1 under the *WC Act* and as Endangered under the *EPBC Act*. Restricted to remnant habitat patches in south west WA where populations are managed by way of fox control and reintroduction programs (e.g. Avon Valley, Walyunga National Park and Paruna Sanctuary).

Habitat: Open forest and woodland with a low, dense, understorey of tussock grasses or woody scrub. Formerly occurred in a wider range of habitats including spinifex hummock grasslands.

Likely presence in subject site: No suitable habitat and locally extinct on coastal plain.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

### **Western Brush Wallaby *Macropus irma***

Status and Distribution: Listed as Priority 4 by DBCA. The western brush wallaby is distributed across the south-west of Western Australia from north of Kalbarri to Cape Arid (DBCA information pamphlet).

Habitat: The species optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland and is uncommon in karri forest (DBCA information pamphlet).

Likely presence in subject site: Bushland within and surrounding the subject site is too small and/or fragmented to support a population of this species.

Not considered a potential species based on currently available information.

Potential impact of development: No impact on this species or its preferred habitat will occur.

**Water Rat *Hydromys chrysogaster***

Status and Distribution: Listed as Priority 4 by DBCA. The water rat is widely distributed around Australia and its offshore islands, New Guinea and some adjacent islands. It occurs in fresh brackish water habitats in the south-west of Western Australia but occurs in marine environments along the Pilbara coastline and offshore islands. Previous survey work in the south west suggested this species was relatively common and widespread though difficult to capture (Christensen *et al.* 1985, How *et al.* 1987).

Habitat: The water rat occupies habitat in the vicinity of permanent water, fresh, brackish or marine. Likely to occur in all major rivers and most of the larger streams as well as bodies of permanent water in the lower south west (Christensen *et al.* 1985).

Likely presence in subject site: While the Yule Brook passes through the subject site it appears to be too degraded to support individuals of this species. There is also a lack of recent, local records. Based on this information this species is therefore considered unlikely to occur.

Potential impact of development: No impact on this species or its preferred habitat will occur.

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